TRANSACTIONS

OF

The Association of Life Insurance Medical Directors of America

SIXTY-FIFTH ANNUAL MEETING

James R. Gudger, M. D.
Editor

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SIXTY-FIFTH ANNUAL MEETING

The Sixty-fifth Annual Meeting of The Association of Life Insurance Medical Directors of America was called to order at eleven o'clock Monday morning, October 23, 1956, in the University Room of the Roosevelt Hotel, New Orleans, Louisiana, Dr. Ralph R. Simmons, President, presiding.

DR. RALPH R. SIMMONS — The Scientific Session of this 65th Annual Meeting of the Association will come to order.

It is a tradition of this meeting that the Chairman of our sister organization, the Medical Section of the American Life Convention, be invited to address the Association as the first order of business. It is, therefore, with pleasure that I welcome the Chairman of the Medical Section, Dr. Arthur E. Parks. Will you come to the rostrum?

DR. ARTHUR E. PARKS — Dr. Simmons and Fellow Members of the Association:

It is a great privilege and pleasure to bring to you at this time the greetings of the Medical Section of the American Life Convention. Our two societies share common ideals and objectives in the continued study and advancement of life insurance medicine. I extend to all of you a very hearty invitation to attend the next Annual Meeting of the Medical Section, which will be held on Thursday, Friday, and Saturday, May 30 and 31 and June 1, 1957. The meeting will take place at the Lake Placid Club, Lake Placid, New York, a beautiful resort in the Adirondacks, which should be at its best at that time.

As is the custom of the Medical Section, the mornings will be devoted to scientific sessions and the afternoons to golf, tennis, mountain trips, and other forms of recreation. The ladies will have their own activities and will share the social gatherings that are a feature of the late afternoons and evenings.

Dr. James Reddy, Program Chairman, has arranged a stimulating scientific program of unusual interest and which I can assert with confidence you will enjoy and long remember. It is my sincere hope that as many of you as possible will attend the meeting and will bring your wives with you. Thank you very much.

DR. SIMMONS — It is our good fortune this year to also have a speaker who has served in his present capacity for the past ten years, and this year marks his tenth anniversary. I refer to our good friend, Dr. Francis R. Dieuaide, who is the Scientific Director of the Life Insurance Medical Research Fund. I have asked him to present this year, instead of his usual informal talk, a more formal presentation on "Recent Developments in Our Knowledge of the Major Types of Cardiovascular Disease." Dr. Dieuaide.

RECENT DEVELOPMENTS IN OUR KNOWLEDGE OF THE MAJOR TYPES OF CARDIOVASCULAR DISEASE

FRANCIS R. DIEUAIDE, M. D.
Scientific Director,
Life Insurance Medical Research Fund

It is only during the past decade that concerted efforts have been made to solve the major problems of heart disease. In these ten years, atherosclerosis and hypertensive disease have become the major interests of many highly qualified investigators. Much pertinent work is being done in the basic medical sciences, as well as by clinical and epidemiological methods. A large store of knowledge has been accumulated — much of which need not be related here. We should bear in mind, however, that parts of this hard-won information now seemingly unimportant, or even not pertinent to the central problem, may yet turn out to be key points in the final explanation of atherosclerosis or hypertension.

The aim of this presentation is to describe briefly outstanding recent results, and to evaluate their apparent significance and indication of work that now appears to be most urgently needed.

Atherosclerosis

Atherosclerosis, largely because of resultant coronary heart disease, is easily our most serious form of cardiovascular disease. It is present in most adults and it causes some 40 per cent of all deaths. According to the theory now held by most students of atherosclerosis, the disease is mainly the result of a disturbance in fat nutrition or fat metabolism, especially involving the accumulation of cholesterol in arterial walls.

The evidence for this theory is weighty, but not yet conclusive. There are critics who doubt its validity, believing the fat disturbances to be secondary to some unknown path-

ological process. Various efforts now made to put particular consequences of the theory into practice rest on slender foundations. Nevertheless, the general hypothesis, whatever its fate may be, has been and assuredly will continue to be the basis of much productive and valuable work.

It should be noted in passing that the old idea of arteriosclerosis as merely an essential feature of old age is no longer held.

Atherosclerosis has been produced in many experimental animals by a variety of procedures all of which cause disturbances in lipid metabolism. The resulting disease cannot be separated from human atherosclerosis. The difficulty here is twofold: first, we cannot be sure these animals resemble man in their reaction; and second, we do not understand how these markedly different procedures work.

In the effort to explain cholesterol accumulation in atherosclerosis, one must consider whether dietary composition is a fundamental factor. The method most common for inducing atherosclerosis in animals is to feed them more or less large amounts of cholesterol, either alone or with some other procedure. It has been shown, however, that plasma cholesterol levels are influenced by dietary fat content, rather than the blood cholesterol content as such. Furthermore, fats of vegetable origin are influential as well as those of animal origin. When blood fat is raised by feeding neutral fat, hypercholesterolemia quickly follows. Work is now being done to test the possibility that the chemical structure (degree of saturation) of dietary fat is more important than its animal or plant origin.

On the basis of epidemiological studies, Keys and others have presented a persuasive case for the theory that atherosclerosis is the result of a high fat diet. It is notably true that the prevalent American diet has in the past generation come to contain a very high proportion of fat (up to 40 per cent or more of total calories), and that our plasma cholesterol levels are high compared to those of many peoples apparently consuming much less fat and much more carbohydrate. The incidence of coronary heart disease is described as much lower

among various peoples whose fat consumption is relatively low. The evidence is not yet entirely convincing, because of doubts as to the accuracy of the diagnoses and of the applicability of the estimates of the dietary composition among the peoples involved. Other variables than dietary fat may be factors.

Further work on these lines may be expected to make more precise information available. In addition, data are needed as to the role of total caloric intake and the interrelationships of various dietary nutrients.

The important suggestion has been made that physical activity may play a key role in atherosclerosis. This might be either through an effect of activity itself on bodily functions (such as endocrine function) or through the interrelation of activity and diet. Evidence has been obtained indicating that high fat diets do not increase the level of serum lipids as long as the excess energy is dissipated as exercise. On the other hand, serum lipid levels apparently tend to rise when fat is deposited as the result of inactivity while on a high fat diet. Here again, skepticism is expressed by some workers as to the significance of exercise. It is obviously another important matter on which our information is deficient.

Whether obesity is or is not associated with the development of atherosclerosis is not clear. An answer to the question cannot easily be obtained. One difficulty is that the disease may develop over a period of many years, whereas obesity may not continue to be present. Life insurance statistics indicating the importance of overweight may be correct. Autopsy statistics indicating the absence of obesity in coronary victims may be misleading.

Many other external or environmental factors have been suggested as causative factors in the development of atherosclerosis, such as "stress." Although the causation of the disease may well be complex, no significant support now exists for any of these other influences.

There are slender indications that heredity may contribute to the atherosclerotic tendency. It should be clear, however,

that the reported rarity of the disease in certain peoples, such as the Chinese, is not evidence that a genetic factor is at work, as there are too many other possibilities that have not been excluded. The very prevalence of atherosclerosis in our population of heterogenous origins would seem to speak against a serious role for heredity.

A thought-provoking study of geographic patterns in coronary heart disease mortality has recently been reported by workers of the U. S. Public Health Service. The results show that the death rates for coronary heart disease in 1950 was about twice as high in some states as in others. For example, the rate per 100,000 for white males in New York was 394, against 191 for New Mexico — a difference of over 100 per cent. There are many peculiarities in the rates. That for Nevada was 333 (174 per cent of the New Mexico rate). Even between New York and Illinois (rate 293) there was a difference of 34 per cent, which is particularly difficult to explain. The rates for white females vary in substantially parallel fashion.

One immediately thinks, as did the authors of this work, of the possibility that differences in diagnostic standards may be chiefly responsible for the varying rates. There are, however, several internal evidences in the results that this is not the case, although diagnostic habits probably play some role.

The authors tested the possibility that urbanization is responsible for the high rates. They found no indication that the pattern for rural areas differs much from that for the country as a whole.

Incidently, this study showed that coronary heart disease in 1950 caused 20 per cent of all deaths of white males aged 35 to 44, and from then on about one-third of all deaths. For the adult years, coronary heart disease death rates are reflected in the rates for all causes.

The results of this study are a new indication of the complexity of the problem of what causes atherosclerosis. No simple interpretation can now be offered in terms of any current theory. Yet, these results suggest a number of studies

that might be fruitful if they are done by intensive methods providing precise information.

As is well known, middle aged women are only about half as susceptible to atherosclerosis as middle aged men. Little new light has recently been thrown on this important sex variation. The situation illustrates our lack of knowledge. It was recently remarked in a medical editorial that differences in dietary patterns can hardly account for this sex variation, as significant dietary differences apparently do not exist. Yet they may exist. Casual observation of female forms in fact seems to suggest that a substantial fraction of younger and middle aged women have more conservative dietary habits than men.

Let us turn now to a brief consideration of some recent fundamental biochemical work bearing on atherosclerosis. It is clearly desirable to acquire an understanding of the abnormalities in bodily mechanisms which give rise to the disease and it may be that knowledge of these abnormal mechanisms is essential for the development of methods of controlling the disease. Partly because our scientific advisors believe such basic biochemical research is the best means of attack, and partly because other support is less readily available for such work, the Life Insurance Medical Research Fund has aided many programs of basic biochemical research. Many important results have been accumulated, some of which may be helpful in other directions, such as the cancer problem, as well as for atherosclerisis. Many of these programs deal with the metabolism of cholesterol, other lipids, and lipoproteins.

It is notable that our knowledge of fat metabolism is relatively poor, especially as to what lipids may be essential and as to the interrelations in nutrition between various lipids and between them and other nutrients.

Biochemists interested in this field are impressed by the amount of cholesterol synthesized in the body which ordinarily greatly exceeds the amount taken in as food. It has also been established that the blood cholesterol content may rise or fall independently of the dietary intake. The body's synthesis of cholesterol is a process of major importance. The main

pathways and key intermediary substances have now been described. Some of the new intermediates, such as squalene, are now recognized for the first time as important biological compounds. This work has now progressed so that it is possible to study the enzymatic mechanisms in cholesterol synthesis. It may soon be possible to analyze the factors which control the supply of cholesterol.

Indications have already been secured that a complex pattern of hormonal activity may control cholesterol synthesis. In these findings, as well as in other ways, leads have been obtained that might result in means to control atherosclerosis.

Helpful new information has been gained about the transportation of lipids in the blood. This occurs in complicated patterns involving differing physical states for the lipids and differing compounds with proteins (lipoproteins). The patterns have been shown to vary, both in normal subjects and in patients. The reasons for such variations, and especially their relations to diets, are matters of urgent interest. So far, the prevalent feeling is that these patterns cannot be reliably used in diagnosis or prognosis.

As to total quantity, cholesterol synthesis occurs mainly in the liver. It is notable, however, that the arterial wall has been found capable of making cholesterol. Indeed, most of the phospholipid in the atherosclerotic aorta is synthesized in situ. It is remarkable that while cholesterol feeding depresses cholesterol synthesis in the liver, it does not do so in the arterial wall. This might account for continuation of the sclerotic process after the initial factor ceases to operate.

These findings and other considerations remind us that the arterial wall should not be regarded as merely passive. Some explanation is needed for the markedly patchy distribution of atherosclerosis. Recent work has given renewed interest to the possible role of repeated arterial injuries, such as those caused by various infections.

It has been clearly demonstrated that regression of atherosclerosis can be produced, though direct evidence in man is lacking. A recent report describes marked regression in ani-

mals treated with the heparin-like substance sulfonated alginic acid. Regression occurred in spite of continued high cholesterol feeding.

Since the significant damage resulting from atherosclerosis is due to thrombosis, we need to know more about the initiation of this process. Little new information is available, however. It is probable that small coronary occlusions are much more common than we realize. In a recent carefully studied series of autopsies on persons dead of occlusion, 87 per cent showed more than one vessel to be severely obstructed. The development of anastomoses is saving many lives.

One of our worst handicaps is the inability to diagnose the vast majority of cases of "silent" atherosclerosis. This is a handicap not only in handling practical human problems, but also in investigative work.

In regard to the treatment or prevention of atherosclerosis at present, I can only state my personal opinions, since there is no general agreement as to what should be done, if anything. The theory that atherosclerosis is linked to a disturbance of fat metabolism is the most promising one we have. The information that many Americans are now consuming relatively large amounts of fat is impressive. Available evidence, however, falls far short of justifying a general campaign for a drastic change in our dietary habits. I would limit general advice to the avoidance of overweight, the maintenance of significant physical activity, and restriction of dietary fat to a reasonable proportion. A more rigid dietary management should be suited to the individual by his personal physician.

I believe we have ample justification for looking forward to effective means of controlling atherosclerosis.

Essential Hypertension

Essential hypertension is a diagnosis reached by exclusion. The majority of the causes for secondary hypertension lie in disturbances of kidney, adrenal, or central nervous system functions. We are still quite in the dark as to the cause of essential hypertension, although the work of recent years has

clarified the problem somewhat. The usual current explanation of the etiology is a mosaic statement, attempting to bring in all or most of the factors believed to play some role in high blood pressure.

A view long quietly held by some has recently been brought to the fore, according to which hypertension is not in itself a disease. This view, however, seems merely to emphasize the fact that many hypertensive individuals live long years without symptoms. It is also true that the height of the blood pressure is not necessarily a measure of the severity of complications. High blood pressure appears to be merely a manifestation of a more general and deep-seated disturbance, the nature of which we particularly need to know. Barring accidents, most hypertensive subjects undergo serious pathological changes related to their hypertension. In a recent careful study, although some individuals were found to live with hypertension as long as forty years, the average age at death was only fifty-two.

A continuingly active line of work deals with humoral substances capable of raising the blood pressure. The more important of these at present are angiotonin (hypertensin), pharentasin, and the adrenal hormone nonadrenaline. Aldosterone, the relatively newly isolated adrenocortical hormone, has been added to this group through the recent finding that hypertensive patients excrete comparatively large amounts of it. Minute amounts of aldosterone cause retention in the body of sodium and promote excretion of potassium. Since these reciprocal disturbances in mineral metabolism are features of hypertension, confirmation of this new finding is especially desirable.

Extensive studies have been made of the mechanism by which dietary deprivation of potassium causes a fall in blood pressure. It was found to be linked with adrenocortical function.

It is a common assumption that kidney damage plays a part in the pathogenesis of hypertension. We know to our regret that evidence of kidney damage cannot be found by present methods in many hypertensive subjects. The usual view is

that in the presence of kidney damage, a blood pressure-raising agent is produced. Yet one of the striking findings in recent years is that hypertension can continue in dogs from which the kidneys have been removed.

A hitherto unrecognized pressor factor has been found in normal human urine, as well as that of other animals. Its excretion is dependent upon adequate protein nutrition, adequate adrenocortical function, and adequate kidney function. The behavior of this agent suggests that renal hypertension may be the result of failure to excrete it. Purification of this agent, now under way, will make possible further studies of this interesting discovery.

Hypertensive patients have recently been shown to have impaired retinal vascular reactivity in advance of clinical evidence of impaired kidney function. An objective method has thus been provided for assessing degenerative vascular changes and relating them to renal function. By the time renal damage is apparent, loss of retinal vascular reactivity is usually far advanced. This finding is a new indication that generalized degeneration occurs relatively early in the small arteries of hypertensive subjects.

New information has strengthened the long-standing impression that heredity is a weighty factor in the tendency to high blood pressure. The fact that no method is apparent by which we could influence an hereditary factor encourages the search for other causes.

I am conscious that this is a highly selective, even somewhat sketchy, account of recent work bearing on the pathogenesis of hypertension. In particular, the significance of pharmacologic studies of newer hypotensive agents has been omitted.

In regard to treatment, recent reports show that there has been considerable improvement in the management of hypertensive patients. Those with slight disturbances are more conscientiously and more successfully handled with reassurance, appropriate psychotherapy, and mild sedation. Rauwolfia and its preparations have been found very useful. The more severe cases are often treated with rauwolfia in combination with veratrum (as protoveratrine).

The most striking advance, however, is in the ability to prolong the lives of patients in the malignant stage by the use of the methonium compounds and hydralazine, and even by diet alone. A recent report describes twenty-seven out of forty-six patients with malignant hypertension and moderate nitrogen retention as alive and working after almost two years. It is stated that heart failure almost disappeared as a cause of death in patients treated with ganglionic blocking agents and hydralazine. Coronary occlusion became the outstanding offender.

Dietary management, with restriction of total caloric intake and of sodium content has been conclusively shown to be effective in controlling the progress of many even severely affected patients. I have the impression that much more could be made of dietary management, especially in cases in which sodium restriction does not have to be as great as it is in the rice diet. The difficulty of securing the long-term careful cooperation of patients should be overcome.

The successful use of the powerful anti-hypertensive drugs now available and of very low sodium diets calls for a high degree of skill. Although a few students believe that basic aspects of the disease are affected by these treatments, it seems best to regard them as palliative. Certainly, we have no way at present of preventing the development of essential hypertension.

Rheumatic Heart Disease

The outstanding recent development in connection with rheumatic heart disease is the reliable production of the condition in animals, following streptococcal infections of the throat. Practically all the experimental animals develop heart damage like that of human rheumatic heart disease. Previous efforts to this end have been successful in only rare instances. It is of special interest that the early results do not support the prevalent theory that an immunological mechanism underlies rheumatic fever.

Reference should be made to the successful prevention of rheumatic fever by the prophylactic use of penicillin and sulfonamides, although this is not solely a recent achievement.

The surgical relief of mitral stenosis has become a relatively common procedure. In many of the properly selected cases, very good results are obtained. It is now realized, however, that only patients with predominant valvular obstruction should be selected for the operation. Those with predominant myocardial damage are not benefited. Thorough physiological study has been shown to be necessary, in addition to clinical study.

Surgical Treatment

Great progress has been made in the development of reparative surgery in the open heart under direct vision. On the basis of experience gained with human cross circulation donors much simpler and more satisfying procedures have been developed by the workers at the University of Minnesota. A simple disposable plastic tube is used to act for the patient's lungs in oxygenating blood and removing carbon dioxide. An efficient pump replaces the patient's heart during the operation. Patients with congenital heart malformations hitherto inaccessible have already been successfully treated. The indications are that a large number of infants with congenital heart defects may be cured. Futhermore, such procedures may make it possible to extend greatly the scope of surgical treatment for acquired forms of heart disease.

The appearance of fibrillation of the heart muscle during these operations has been one of the dangers faced by the cardiac surgeon. The recent development of antifibrillatory drugs is very helpful.

I believe you will agree with me that substantial progress has been made in heart research and that the outlook is most encouraging.

Life Insurance Medical Research Fund

Life insurance companies may take pride in their substantial support of heart research through the Life Insurance Medical Research Fund. Our grants are keenly sought by highly qualified investigators throughout the United States and Canada. In 1955-56 over one hundred research programs were aided and twenty-seven research fellowships were supported. Awards

during the year amounted to over $960,000, bringing the Fund's total allocations to more than $8,160,000. Our new Annual Report has just been distributed to all of you. It brings up to date the detailed account of the Fund's work.

DR. SIMMONS — I am sure that Dr. Dieuaide's remarks have brought more forcibly to our attention the fact that the dollars contributed and being used are resulting in some positive findings, although he claims that they are still in the somewhat embryonic stages.

In contemplating subjects for discussion at this meeting, we felt that a statistical study based upon a large clinical experience in certain medical impairments might be of great value in the proper interpretation of the evaluation of certain life insurance statistics. It was only with great hesitancy that I approached our next speaker and proposed a study of the ultimate mortalities in certain gastrointestinal disorders observed at the Mayo Clinic. He very kindly consented to undertake such a study. He is eminently qualified to present and discuss mortalities in gastrointestinal disorders since he is Chief of the Department of Gastroenterology at the Mayo Clinic, where he has the title of Professor of Medicine in the University of Minnesota at the Mayo Foundation and where he is President of the Staff of the Mayo Clinic. Additionally, he is President-Elect of the Minnesota State Medical Association and is a member of the Editorial Board of Gastroenterology. His latest recognition came in his election as Co-Chairman of the World Congress of Gastroenterologists, which will meet in Washington, D. C. in 1958.

I take great pleasure at this time in introducing to you Dr. Jacob A. Bargen, who will address us on "Survival Rates and Mortality Studies: Chronic Ulcerative Colitis and Regional Enteritis with Comments on Other Ulcerative Lesions of the Digestive Tract."

CHRONIC ULCERATIVE COLITIS AND REGIONAL ENTERITIS: SURVIVAL RATES AND MORTALITY STUDIES WITH COMMENT ON OTHER ULCERATIVE LESIONS OF THE DIGESTIVE TRACT*

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Studies of the degree of disability and of survival rates among persons affected by chronic ulcerative colitis and regional enteritis are significantly lacking. One of the reasons for this undoubtedly is that few physicians have cared for enough patients with these diseases to permit a significant analysis of cases. Another is the impression, often accepted as a fact by insurance carriers, that persons with these diseases are not insurable. Since my associates and I have had an unusually large experience with the study and care of individuals with these conditions, and since we have made contributions to the medical literature concerning groups of these patients from time to time, your President asked me whether I would be willing to study further the life histories and survival rates in a significant group of these patients. Such an investigation might be of benefit to insurance carriers. However, it has been my ambition for a long time to contribute studies which would give individuals with chronic ulcerative colitis and regional enteritis more favorable consideration when they apply for insurance. The opportunity was accepted, fully realizing that such a study was a complicated and time-consuming undertaking. The possibilities of its results presented a challenge that could not be denied.

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*Read at the meeting of the Association of Life Insurance Medical Directors of America, New Orleans, Louisiana, October 23 to 25, 1956.

†The Mayo Foundation, Rochester, Minnesota, is a part of the Graduate School of the University of Minnesota.

Chronic Ulcerative Colitis: Medical Aspects

Comments on the Medical Histories of Patients with This Disease. The records of 2,000 patients given a diagnosis of chronic ulcerative colitis at the Mayo Clinic from January 1, 1918, through December 31, 1937, were reviewed with particular reference to the type of individual afflicted, the age, race, sex and occupation of these individuals, the incidence of complications, the causes of death and survival rates. The diagnosis in each case was determined by a careful clinical history, examination of the stools, proctosigmoidoscopic examination and roentgenologic examination of the large intestine. No known cases of ulceration of the large intestine due to amebiasis, tuberculosis, venereal lymphogranuloma, shigellosis or other conditions with specific causes were included in this study.

Among the 2,000 patients were 1,113 men and 887 women. The average duration of symptoms prior to first examination at the clinic was 4.7 years, and most racial groups living in this country, except Orientals, were represented.

All varieties of occupational groups were noted. A random analysis of the occupation of more than 500 men, aged more than 20 years, revealed that the largest single group consisted of farmers or ranchers. Most women in the same age distribution were housewives.

The age of onset of the disease was between 1 and 79 years (table 1). The mean age at onset among the men was 30.2 years and among the women 28.9 years. These figures indicate that the age at onset in both sexes is similar.

The outstanding feature of the medical histories of these patients was the passage of blood by rectum, diarrhea, abdominal cramps and loss of weight. In most individuals a significant illness or emotional disturbance had not preceded the onset of chronic ulcerative colitis. Three hundred forty-five patients, however, dated the onset of the disease to some unusual occurrence. This small number may have been due in part, at least, to the failure of the physicians to inquire into such occurrences or if they did inquire, to record them at the time the patients were seen. In the last several decades particular attention has been paid to this point, and a much greater

TABLE 1

Age at Onset of Symptoms of Chronic Ulcerative Colitis*

Age at onset, years	Men		Women		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
0-9	42	3.8	35	4.0	77	3.9
10-19	181	16.4	158	17.9	339	17.1
20-29	392	35.7	326	37.0	718	36.2
30-39	252	22.9	214	24.3	466	23.5
40-49	136	12.3	89	10.1	225	11.4
50-59	71	6.4	43	4.9	114	5.7
60-69	21	1.9	13	1.5	34	1.7
70-79	7	0.6	3	0.3	10	0.5
Total	1,102†	100.0	881†	100.0	1,983	100.0
Mean	30.2 years		28.9 years		29.6 years	

*Reprinted from Sloan, W. P., Bargen, J. A. and Gage, R. P.: Life Histories of Patients with Chronic Ulcerative Colitis: A Review of 2,000 Cases. Gastroenterology. **16**:25-38 (Sept.) 1950. Reproduced by courtesy of the Editor.

†Age of onset for 11 men and 6 women was not determined.

incidence of unusual occurrences has been noted with the onset of symptoms of the disease. However, among the 2,000 patients who form the basis for this study, only 345 dated the onset of their disease to some unusual occurrence.

In 141 cases, the onset of symptoms was concomitant with, or immediately preceded by, upper respiratory infections, pneumonia, scarlet fever or measles. Fifty-four women dated the onset of the chronic ulcerative colitis to pregnancy or the immediate postpartum period. In 41, the initial symptoms occurred after severe purgation. In 33 cases, they followed some surgical procedure, often a hemorrhoidectomy and in 33 they followed emotional trauma. Usually, the emotional trauma was in the nature of a loss of a member of the family. In two instances the death of one sibling

from chronic ulcerative colitis was immediately followed by the onset of the disease in another.

In only 96 individuals was there a history of an obvious psychoneurosis. The average patient was not easily affected by psychic disturbances prior to the onset of the disease. In other words, the psychosomatic phase of the history was unimpressive.

In only 26 instances were multiple cases of chronic ulcerative colitis in the same family found. The combination of father and son with this disease, or mother and daughter, was rare. Two or more siblings appeared to be the commonest combination.

Significant Factors on Exacerbation. Remissions and exacerbations were characteristic of the clinical course of most of the patients. Usually, no cause for reactivation of the disease was noted. The most frequently mentioned precipitating factor, however, was an upper respiratory infection.

Emotional upsets were thought to be the cause of reactivation of the disease by 71 patients. Physical exhaustion from excessive work, miscellaneous infections and pregnancy was blamed occasionally for recurrences.

The effect of pregnancy on the activity of chronic ulcerative colitis was variable. In 14 patients, exacerbations were precipitated by pregnancy. Reactivation of the disease during pregnancy was observed by others. In 10 patients, there was no reactivation during pregnancy. One patient in this category gave birth to six children in 7 years without difficulty. A marked improvement was noted during the months of gestation in seven cases. The mother of four children, all born since the onset of chronic ulcerative colitis, stated, "With the exception of my first pregnancy, I am never more healthy nor free of colitis than when I am pregnant."

Complications in General. Complications adding to the problem of the management of patients with ulcerative colitis occurred both locally, namely, in the bowel itself, and distantly, that is, systemically. At times, these complications became the major problems for the individual afflicted.

In general, the incidence of complications increased with the severity of the disease. Although some type of complication developed in 704 patients (35.2 per cent) of the group, often these

complications were multiple and at times mild. We shall mention the systemic complications first.

Distant Complications. Distant complications or problems, definitely related to the colitis and affecting points in the human body other than the large intestine, are relatively few in number, but at times are disabling. Infectious arthritis, rheumatoid arthritis or spondylitis occurred in 155 individuals (7.8 per cent). The relationship between the onset of the arthritis and the onset of the colitis was variable. Symptoms of arthritis preceded the colitis in 32 instances, followed it in 89, and were simultaneous with it in 34.

In 45 patients unpleasant cutaneous lesions developed during the course of chronic ulcerative colitis. These consisted particularly of erythema nodosum, erythema multiforme and pyoderma gangraenosum; there were 26 cases of pyoderma gangraenosum.

Cirrhosis of the liver occurred in a small percentage of individuals; hepatitis in a few others.

Local Complications. The most frequent complication, namely polyposis, was found in 387 (19.4 per cent) of the patients. The polyps were usually inflammatory, mucosal tags, occurring as the result of massive mucosal destruction and subsequent healing. The greatest frequency of the polyps was in the rectum and in the rectosigmoid portion of the large intestine, or in that portion where the disease was usually most severe and destructive. The other portions of the colon were involved with decreasing frequency and with progression of the disease proximally.

Once destroyed by electrocoagulation, inflammatory mucosal tags had little tendency to recur. This was in marked contradistinction to the polyps of the adenomatous type, whether they were single or multiple or familial. Electrocoagulation was carried out in 52 of such cases. Proctoscopic examination in 36 of these from 1 to 12 years later revealed no evidence of recurrence in 31.

These pseudopolyps occasionally disappeared spontaneously. Such regression was noted in 9 per cent of the patients with this complication.

Strictures were the next commonest local complication. Localized narrowing of the rectum or colon to a lumen of 1.5 cm. or less in diameter was present in 11 per cent of the 2,000 patients. The

commonest sites were the rectum and sigmoid. The strictures were located there in 98 per cent of the cases in which they occurred. Strictures were usually single, but sometimes were multiple. The incidence of the strictures was higher in patients who had the severe form of colitis.

Although all these patients bled, this being a pathognomonic symptom of the disease, massive hemorrhage of the exsanguinating type from the rectum or colon was relatively uncommon. Twenty-two patients (1.1 per cent) had hemorrhages that were difficult or impossible to control. Massive bleeding was responsible for, or associated with, fatal termination of the disease in 12 of the 22 cases in which death due to the colitis occurred. There was no preponderance of either sex in this situation.

Perforation of the bowel is a serious complication. It occurred in 87 (4.4 per cent) of the patients. In 39, the bowel perforated into the peritoneal space. Peritonitis, either generalized or localized, with abscess developed in these cases. The commonest site of perforation was the transverse or descending colon.

Perforation of the bowel with subsequent formation of a fistula occurred in 48 cases. The majority of the fistulas in women were rectovaginal. Males had fewer fistulas but a greater variety of them. Three males had fistulas between the colon and the upper portion of the gastrointestinal tract, including the stomach and duodenum. Four had fistulas between the rectum or sigmoid and bladder; six had colocutaneous or other cutaneous fistulas.

In 121 cases (6.1 per cent) extensive perirectal or perianal abscess or sinuses and ischiorectal abscesses complicated the chronic ulcerative colitis. The group included 40 women, nine of whom had an associated rectovaginal fistula. In two of the men who had recurring fistulas secondary amyloidosis developed subsequently. Anal fistulas were the commonest complication of a fistulous nature. Not infrequently, when the colitis healed, the fistula would subside so that no operation was necessary for its repair. By the same token, if the colitis healed, the rectovaginal fistulas of the women could be repaired safely.

Of special interest is the complication of malignant disease.

Chronic Ulcerative Colitis Complicated by Malignant Neoplasm of the Colon

Because of the great interest in this phase of the problem, a special study was made of the entire group of patients in an attempt to determine accurately the incidence of carcinoma in ulcerative colitis. Thus, it became advisable to omit certain of the 2,000 patients from the study for carcinoma as a complication. It seemed reasonable to omit those patients who died in the hospital after their first admission to the clinic. It was also decided to exclude patients who were 50 years of age or older at the time of their first visit to the clinic. One hundred patients who were not traced or who had not been heard from since their original visit to the clinic were also omitted.

Finally, a few patients who died within 1 year after visiting the clinic and who were found to have a neoplasm of the rectum or colon were omitted in order to avoid inclusion of any cases in which possibly the cancer was associated with the ulcerative colitis at the time of the initial diagnosis.

One thousand five hundred and sixty-four patients were, therefore, included in the study for carcinoma; they were less than 50 years of age at the time the diagnosis of ulcerative colitis was made at the clinic and were free of malignant lesions for at least a year after the first diagnosis was made.

Our follow-up study, made in 1952, of the 1,564 patients in this series revealed that 98 had died from carcinoma of the rectum or colon. Malignant neoplasms developed in only 10 of the 98 patients in 2 to 5 years after the diagnosis of chronic ulcerative colitis was originally made at the clinic, and only two of the 10 died in that period.

Information relative to the subsequent development of the malignant neoplasms came from three sources which are listed according to the degree of reliability, as follows: The most reliable information was obtained from the diagnosis of a malignant lesion established while the patient was under observation at the clinic. There were 43 such cases. The next most reliable information was obtained from letters from other physicians. There were 33 of these cases. Information concerning the remaining 22 patients was obtained from letters from relatives.

Comparison of Observed Deaths from Malignant Neoplasms of the Colon with Expected Deaths from Malignant Disease in the General Population. We have, then, a total of 1,564 patients in the present study. We wished to compare the 98 patients who subsequently had malignant lesions of the rectum or colon and died in our group with the expected number of cancer deaths from the normal population. Unfortunately, no reports were available which gave the age-specific death rates for cancer of the rectum or colon. Specific death rates, given in 5 year groups were available for total malignant neoplasms and for malignant neoplasms of the digestive organs and peritoneum.

The series of 1,564 patients was divided into 5 year age groups and the expected number of deaths for the two cancer classifications was calculated. The 294 patients in the group of patients 25

TABLE 2

Chronic Ulcerative Colitis: Examples of the Calculation of Expected Deaths Due to Malignant Neoplasm of Colon Among 294 Patients, Age 25 to 29 Years*

Follow-up period, year	Age, year	Person-years exposed	Total malignant neoplasms		Malignant neoplasm of digestive organs and peritoneum	
			Death rate†	Expected deaths	Death rate†	Expected deaths
0-4	30-34	1,338.5	0.000256	0.342656	0.000048	0.064248
5-9	35-39	1,062.5	0.000480	0.510000	0.000107	0.113688
10-14	40-44	813.0	0.000826	0.671538	0.000205	0.166665
15-19	45-49	452.5	0.001379	0.623998	0.000398	0.180095
20-24	50-54	199.5	0.002211	0.441094	0.000739	0.147430
25-29	55-59	79.5	0.003219	0.255910	0.001199	0.095320
Total		3,945.5		2.845196		0.767446

*Reprinted from Bargen, J. A., Sauer, W. G., Sloan, W. P. and Gage, R. P.: The Development of Cancer in Chronic Ulcerative Colitis. Gastroenterology. **26**:32-37 (Jan.) 1954. Reproduced by courtesy of the Editor.

†Death rates obtained from Vital Statistics, Special Reports. Deaths and Death Rates for 64 Selected Causes By Age, Race, and Sex: United States, 1949. Washington, D. C., National Office of Vital Statistics, Federal Security Agency, vol. 36, no. 14, March 21, 1952, pp. 252-253.

to 29 years old had a total "person-years" exposure of 3,945.5 in the 30 year follow-up period. The method of calculating the number of person-years exposed for each age group in the total series was similar to that used in table 2 and then combined into 5 year groups. The death rates from malignant disease in the general population and for malignant disease of the digestive organs and peritoneum were obtained from "United States Vital Statistics, Special Reports," and it is seen that about three deaths were expected from all types of cancer and about one death was expected from the more specific classification (table 2).

Comparison of Observed Deaths from Malignant Neoplasms of the Colon with Expected Deaths in General Population. Similar calculations were made for the other age groups.

The findings are summarized in table 3. The observed deaths from malignant neoplasms of the colon were compared with expected deaths from malignant neoplasms in the general population. For the total series of 1,564 patients, the follow-up data provided more than 20,000 person-years for the analysis. The expected number of deaths for all types of malignant neoplasms was estimated to be about 27, while the expected number of deaths due to malignant neoplasms of the digestive organs and peritoneum was estimated to be nine. The ratios of observed deaths from malignant neoplasms of the rectum and colon to expected deaths as shown in table 3 were found to be about 4:1 and 11:1.

Obviously the expected number of deaths from malignant neoplasms of the rectum and colon would be less than the nine, say three or four deaths, then the ratio of observed to expected deaths would be about 20:1 or 30:1. Thus, we may conclude that cancer of the rectum or colon is more likely to develop in patients with chronic ulcerative colitis than in persons of the same ages in the general population. The ratios of observed to expected deaths given in the last two columns of table 3 are of interest also. From these it can be seen that age is a definite factor, and cancer is more likely to develop in a young patient with chronic ulcerative colitis than in the older patient.

These findings indicate that on the average the death rate from cancer of the rectum or colon among persons with ulcerative colitis

TABLE 3

Chronic Ulcerative Colitis: Comparison of Observed Deaths from Malignant Neoplasms of the Colon with Expected Deaths in the General Population*

Age at diagnosis, year	Patients	Person-years exposed	Expected deaths†		Observed deaths, O : Malignancy of rectum and colon	Ratio of observed to expected deaths	
			Total malignant neoplasms, E_1	Malignant neoplasms of digestive organs and peritoneum, E_2		O : E_1	O : E_2
2-4	8	132.5	0.010	0.001	1		
5-9	25	304	0.025	0.002	5	85.5	650.0
10-14	65	863.5	0.117	0.017	7		
15-19	127	1,424.5	0.280	0.050	12	42.9	240.0
20-24	219	2,609.5	0.938	0.208	11	11.7	52.9
25-29	294	3,945.5	2.845	0.767	17	6.0	22.2
30-34	301	3,911.5	4.478	1.342	15	3.3	11.2
35-39	229	3,151.5	5.746	1.930	9	1.6	4.7
40-44	166	2,144.5	5.702	2.107	15	2.6	7.1
45-49	130	1,738.5	6.631	2.676	6	0.9	2.2
Total	1,564	20,225.5	26.772	9.100	98	3.7	10.8

*Reprinted from Bargen, J. A., Sauer, W. G., Sloan, W. P. and Gage, R. P.: The Development of Cancer in Chronic Ulcerative Colitis. Gastroenterology. **26**:32-37 (Jan.) 1954. Reproduced by courtesy of the Editor.

†Death rates obtained from Vital Statistics, Special Reports. Deaths and Death Rates For 64 Selected Causes By Age, Race, and Sex: United States, 1949. Washington, D. C., National Office of Vital Statistics, Federal Security Agency, vol. 36, no. 14, March 21, 1952, pp. 252-253.

is say 30 times that from cancer of the rectum or colon in the general population of the same age and sex. The patient with chronic ulcerative colitis, however, should not be unduly alarmed for the annual death rate from cancer of the colon or rectum among persons with ulcerative colitis is estimated to be between one and two per hundred.

Survival Rates for Patients with Chronic Ulcerative Colitis

We naturally wonder how many of our patients have survived and led useful lives. An important part of our study, therefore, concerns itself with life expectancy. Our main reason for studying a sizeable group of 2,000 was to obtain results that could be considered dependable.

From the clinic or hospital records it is not possible to compute the survival rates from a base line taken from the date of the onset

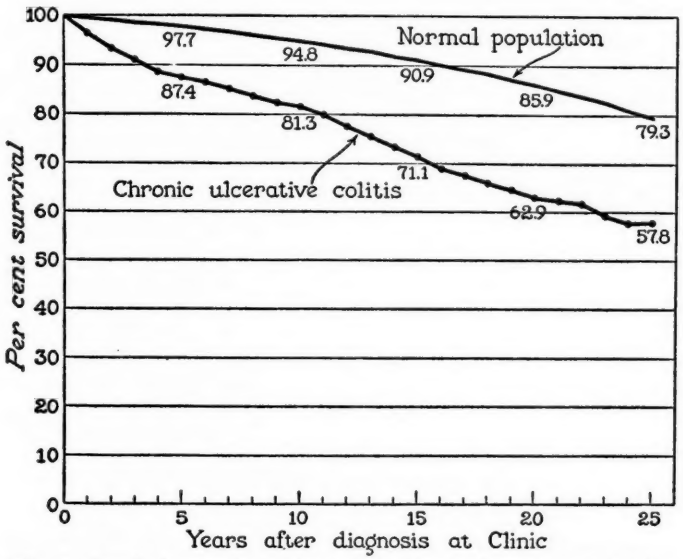

Fig. 1. Survival curve for patients with chronic ulcerative colitis. (Reprinted from Bargen, J. A., Sauer, W. G., Sloan, W. P. and Gage, R. P.: The Development of Cancer in Chronic Ulcerative Colitis. Gastroenterology. **26**:32-37 [Jan.] 1954.) Reproduced by courtesy of the Editor.

of the disease. Therefore, the date chosen for the analysis was the first date on which the diagnosis was made at the Mayo Clinic.

The survival curve for patients with ulcerative colitis for a period of 25 years is compared in figure 1 with the survival curve for the normal population beginning at age 34, which was the average age of the group at the time the diagnosis was made at the clinic. Comparative figures are shown at 5 year intervals. The mortality rate was greatest during *the first year after diagnosis* at the clinic, being about 4 per cent.

After the first year, the yearly death rates varied between 0.1 and 3 per cent.

Experience in this series indicates that the patient with ulcerative colitis has approximately a 60 per cent chance of living 25 years or more. On the basis of this survival curve, insurance carriers could probably estimate the rate of insurability. It must be remembered, however, that this series includes all patients who were given a diagnosis of chronic ulcerative colitis at the clinic from 1918 to 1937, regardless of the severity of the disease and regardless of associated conditions.

Since the survival curve was computed independently of age, it is of interest to see whether age is a factor in the survival picture.

The 5 year and 10 year survival rates according to age in decades are given in table 4. The age is that of the patient at the time the diagnosis of chronic ulcerative colitis first was made at the clinic. The survival rates among the groups of patients who were less than 50 years of age when the diagnosis was made differ little, but the rates are considerably lower for patients who were older.

Of the 2,000 patients, 76.6 per cent were traced for 5 years or longer, and 71.8 per cent were traced for 10 years or longer. When the 5 year and 10 year survival rates as given in table 4 are compared with those given in figure 1, a difference is evident. This difference is due to the method of calculation. The values in table 4 were obtained by the direct or "ad hoc" method, whereas those in figure 1 were obtained by the actuarial method. While results of both methods are correct, the actuarial method gives a more precise picture, since more of the data are used.

TABLE 4

Chronic Ulcerative Colitis: Five and Ten Year Survival Rates According to Age at Time of Diagnosis at Clinic*

Age, years	Patients		Lived 5 or more years after diagnosis at clinic		Patients		Lived 10 or more years after diagnosis at clinic	
	Total	Traced	Number	Survival rate, per cent†	Total	Traced	Number	Survival rate, per cent†
0-9	39	32	26	81.2	39	29	21	72.4
10-19	213	166	133	80.1	213	156	108	69.2
20-29	571	420	343	81.7	571	394	291	73.9
30-39	589	457	366	80.1	589	425	316	74.4
40-49	335	267	217	81.3	335	252	190	75.4
50-59	176	133	97	72.9	176	126	73	57.9
60-69	65	50	32	64.0	65	47	19	40.4
70-79	12	7	2	28.6	12	7	1	14.3
Total	2,000	1,532	1,216	79.4	2,000	1,436	1,019	71.0

*Reprinted from Sloan, W. P., Bargen, J. A. and Gage, R. P.: Life Histories of Patients with Chronic Ulcerative Colitis: A Review of 2,000 Cases. Gastroenterology. **16**:25-38 (Sept.) 1950. Reproduced by courtesy of the Editor.

†Based on traced patients; inquiry as of January 1, 1949.

It will be noted from the figure 1, that at the end of 25 years 57.8 per cent of the patients with ulcerative colitis had survived compared to 79.3 per cent of the normal population.

Causes of Death Among Patients with Chronic Ulcerative Colitis

Among the patients who came to necropsy at the clinic, only nine did not have a major contributing factor other than the severe chronic ulcerative colitis with its attendant toxemia and emaciation which could explain the death. Bronchopneumonia, generalized peritonitis, perforation of the bowel, metastatic abscess, pulmonary emboli and neoplasms contributed to, or were responsible for, the death of the patient in most cases. Some of the deaths were due to unrelated conditions, such as cerebrovascular accident and

hemorrhagic encephalitis, renal failure and perforated duodenal ulcer. These conditions are the cause of death in many illnesses.

Outlook for Children with Chronic Ulcerative Colitis

The outlook of chronic ulcerative colitis in children is generally considered to vary from that in adults. Hoping to shed some light on this question, we studied the life histories of 139 children with chronic ulcerative colitis between the ages of 1 and 15 years who came to the clinic in the decade from January 1, 1944, to December 31, 1953, inclusive.

Follow-up data were available on 126 of the 139 children as of January 1, 1955, a year after the last registration for the group at the clinic. Close and personal observation had been carried out on 40 of the 139. In 18 of these, all evidence of the previous colitis had disappeared, as observed proctoscopically and roentgenologically, and 10 others felt clinically well. In other words, in 28 of the 40, the results of treatment were excellent.

Letters of inquiry were sent to the other 99 and replies were received from 86. Of these, 46 reported their condition with such words as "entirely well," "excellent," "very good," and "good." Fifteen reported their condition as "fair," "getting along well," "going to school and doing the things other children of their age customarily do." Ten of these were greatly improved.

In other words, in 61 the results of treatment for this short period of observation were satisfactory. Of the entire group, 11 patients had died; the causes of death included complications of the colitis, burning to death in a college dormitory accident and a motor scooter accident; several too had died after surgical procedures. It seems, then, from this that the course and outcome of ulcerative colitis in children is not greatly unlike that in adults.

Regional Enteritis

Our study of individuals with regional enteritis concerns a smaller group than the study of ulcerative colitis. However, it is significant. We studied this group of patients with the same objectives in view, stressing the medical history of the patients, incidence of complications, survival rates and causes of death.

Regional enteritis affects mainly young adults and is character-

ized clinically by abdominal cramps, diarrhea, fever, loss of weight, anemia, and perianal abscesses and fistulas. The lesions are usually limited, both in the initial and recurrent cases, to the terminal portion of the small bowel. This location is the expected one, but regional enteritis may be found anywhere in the small intestine, either in localized or in diffuse form.

The lesions are characterized by a granulomatous, necrotizing, ulcerating and cicatricing process and frequently are accompanied by fistulas arising from the lesion in the small bowel and extending into the neighboring viscera or to the abdominal wall. The years in which the patients studied in this series came to the clinic are listed in table 5.

In our series, 334 were males and 266 females. The condition may occur at any age; in our group, the age of onset varied from 4 to 74 years. However, in 55 per cent of the cases, the onset occurred between the ages of 16 and 30 years.

TABLE 5

Years in which Patients with Regional Enteritis First Came to the Mayo Clinic*

Year	Patients	Year	Patients	Year	Patients
1912	1	1931	9	1941	42
1914	1	1932	8	1942	45
1916	1	1933	5	1943	55
1919	1	1934	15	1944	50
1921	1	1935	17	1945	43
1922	2	1936	15	1946	32
1927	1	1937	26	1947	48
1928	1	1938	38	1948	44
1929	1	1939	28	1949	40
1930	6	1940	24		
Total					600

*Reprinted from Van Patter, W. N., Bargen, J. A., Dockerty, M. B., Feldman, W. H., Mayo, C. W. and Waugh, J. M.: Regional Enteritis. Gastroenterology. 26:347-450 (Mar.) 1954. Reproduced by courtesy of the Editor.

The ethnic groups represented by these patients are listed in table 6.

Of the 600 patients with regional enteritis included in this study, 342 had undergone a total of 377 resections of the bowel for this disease at the Mayo Clinic, and 198 of the patients had not been subjected to any surgical treatment of any kind at the clinic. This indicates that in the years prior to the present decade, surgical treatment was the treatment of choice in regional enteritis. This approach has changed gradually, as will be pointed out when results of treatment are considered.

Complications. Abscess and Fistula. Probably the commonest complication of regional enteritis is an abscess in or around the bowel and the subsequent formation of a fistula. The frequent co-existence of abscesses and fistulas appears to be more than coincidental.

Two general types of abscesses and fistulas are (1) the intra-abdominal and (2) the ischiorectal. The ulcerative process in the bowel frequently extends through the wall of the bowel. In the extension of the process, a neighboring viscus may be

TABLE 6

Ethnic Derivation of Patients*

Derivation	Patients	Per cent
Northern European extraction	428	71.3
Hebrew	153	25.5
Italian	11	3.2
Syrian	3	
Greek	2	
Spanish	2	
Negro	1	
Total	600	100.0

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perforated and a complete fistula may develop. On the other hand, if the peritoneum is not firmly and completely adherent to the surrounding parietes, an abscess develops. This abscess may rupture into an adjoining viscus, for the abscess extends in various directions if limiting adhesions are deficient.

The next commonest site of abscess and fistula is in the ischiorectal region. Anorectal crypts become infected and as a result, ischiorectal and perirectal abscesses develop. The frequency of this condition is striking (table 7).

TABLE 7

Relationship Between the Development of Anorectal Fistulas and Other Accompaniments of Regional Enteritis*

Time when anorectal fistula developed	Patients
Prior to symptoms suggestive of regional enteritis	6
After onset of symptoms of regional enteritis	123
After resection of abdominal lesion of regional enteritis and prior to symptoms suggestive of recurrent disease	10
After onset of symptoms suggestive of recurrent abdominal lesions of regional enteritis	48

*Reprinted from Van Patter, W. N., Bargen, J. A., Dockerty, M. B., Feldman, W. H., Mayo, C. W. and Waugh, J. M.: Regional Enteritis. Gastroenterology. 26:347-450 (Mar.) 1954. Reproduced by courtesy of the Editor.

Obstruction. — Partial obstruction may occur early in cases of regional enteritis as a result of edema and cellular infiltration of the bowel wall. Later, proliferation of fibrous tissue aids in the production of obstruction, and sometimes the process becomes irreversible. Surgical intervention in this type of case is imperative.

Intestinal Bleeding. — Six per cent of the 600 patients gave a history of initial intestinal hemorrhage. Occasionally, the bleeding is in the form of a massive intestinal hemorrhage. The blood may be red, but is more likely to be black and tarry.

Deficiency State. — Deficiency states of varying severity are encountered in association with the initial and recurrent lesions of regional enteritis. They are the result of a number of factors. At times involvement of the bowel is greater than can be demonstrated clinically or roentgenographically. It results in a state similar to that seen in the sprue syndrome. This is relatively rare. There is also the factor of gradually diminishing intake of food as a result of anorexia and fear of the colic which occurs after eating. Then, too, the absorptive surface of the bowel is materially interfered with in some of these cases. Deficiency states in the absence of demonstrable recurrence have in the past tended to support the position that the remaining small bowel is unable to adequately perform its function of absorption.

Arthritis. — Polyarthritis of the rheumatoid type, involving particularly the extremities and small joints, was encountered in 4.5 per cent of the 600 patients studied.

Erythema Nodosum and Pyoderma Gangraenosum. — These are very rare complications as compared to their occurrence in ulcerative colitis.

Treatment. Indications for surgical intervention in regional enteritis are related closely to the complications mentioned. Whereas at one time surgical treatment was suggested as soon as the diagnosis of regional enteritis was made, today surgical intervention is used largely for the complications. The reason for the changed attitude is not the risk of operation but the frequency of recurrence after surgical exclusion or resection.

Of the 600 patients included in this study, 402 were subjected to definitive surgical treatment, and of these, 400 survived the operation. In 135 of the 400 patients who survived definitive surgical measures, the disease remained arrested for the duration of this study. In another 135, the disease recurred. Sixty per cent of the recurrences developed within the first year following surgical operation.

One hundred ninety-eight of the patients were treated nonsurgically by a variety of methods, including diet, administra-

tion of sulfonamides, antibiotics and steroids, and roentgen therapy.

Survival Rates. Of the 198 patients treated, 123 were known to be alive at the time this study was completed. Fifty-one were lost to follow-up, and 24 were known to have died.

The survival data for the 400 patients who survived operation are given in figure 2.

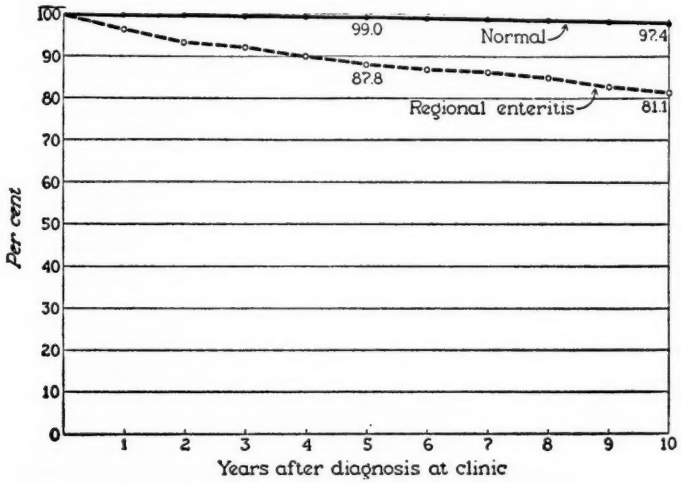

Fig. 2. Survival curve for patients with regional enteritis.

At the end of 10 years after the diagnosis was made at the clinic, 81.1 per cent of the patients with regional enteritis were alive. This should be compared to an anticipated survival of 97.4 per cent of individuals in similar age groups in the general population during a given decade (fig. 2).

Thus, it can be said that while the problem of recurrence is rather gloomy, the problem of survival is not.

Ulcers of the Stomach and Duodenum

As in chronic ulcerative colitis and regional enteritis, the possibility of recurrence of peptic ulcer on a long-term basis

is considerable. The information here recorded is taken from "Prognostic Value of Life Insurance Mortality Investigations" (fig. 3).

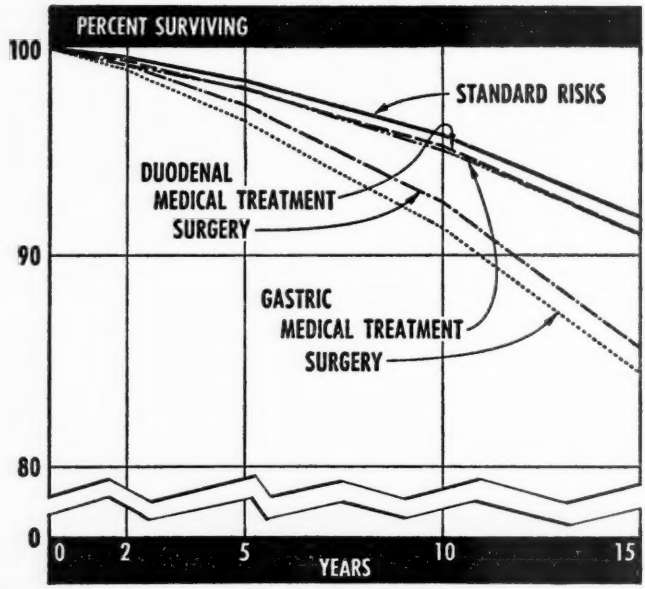

Fig. 3. Survival rates in peptic ulcer. (Reprinted from The Association of Life Insurance Medical Directors of America: Prognostic Value of Life Insurance Mortality Investigations. Privately published, 1955, 10 pp.) Reproduced by courtesy of the Editor.

The risk of operation as well as of other treatment is much less in duodenal than in gastric ulcers. The percentage who survived for 2 to 15 years was lower among the persons who gave a history of having had either duodenal or gastric ulcer within 5 years prior to their acceptance for insurance than among those who were considered as standard risks. The record is appreciably better for patients whose ulcers responded to medical treatment than for those who came to operation. Recurrences accounted for the major part of the excess mortality in all groups. Comparison of the survival curves to those of patients with ulcerative colitis and

regional enteritis (figs. 1 and 2) does not indicate any impressive differences.

DR. SIMMONS — Thank you, Dr. Bargen.

Dr. Bargen will be glad to answer questions directed to him at the Mayo Clinic, and I am sure that after we have had the opportunity to study these figures in the Transactions, many of us will want to avail ourselves of that opportunity. I think it would be proper now to accept Dr. Bargen's invitation to have limited discussion of his paper from the floor.

DR. KARL W. ANDERSON — It is a great pleasure and privilege for me to open the discussion on the paper presented by my fellow Minnesotan and good friend of many years.

The subject of ulcerative colitis has been of more than normal interest to me throughout much of my medical career. Perhaps Dr. Bargen will remember the case of Margaret Anderson, a granddaughter of Dr. Elliot, founder of the University of Minnesota Hospital. Miss Anderson was hospitalized in 1933 with a severe case of ulcerative colitis. Her illness, incidentally, had been preceded by years of living under tremendous emotional stress in her home.

We were anxious that she obtain the best treatment available and asked you to come up to the University Hospital as consultant, because, even at that time you were considered the outstanding authority on colon diseases. It was at the time you developed your vaccine based on Bargen's bacillus as the etiology of ulcerative colitis. Miss Anderson's condition was so fulminating that you suggested an ileostomy be done, and at the same time we were using your vaccine. She recovered, but we immediately arranged for her to leave her home environment and she went to California to live. She married, lived happily and just a few years ago died of cancer of the colon. You might add this interesting case to your list.

This case came to my mind especially because of Dr. Bargen's reference to emotional instability as a factor in inducing ulcerative colitis. All of us enjoy hearing someone espouse theories to which we ourselves subscribe. Dr. Bargen's reference struck a responsive chord with me because

I made a study of a substantial number of ulcerative colitis cases nearly 25 years ago at the University of Minnesota Hospital. The only common denominator which I was able to find running through these many case histories was the factor of emotional instability, and I wrote a paper to that effect. However, our mutual friend, Dr. Hilding Berglund, then head of the Department of Medicine, refused to let me publish it (because he felt that you were apparently on the right track as far as etiology was concerned, mainly the Bargen's bacillus as the cause of ulcerative colitis). Naturally, I take some personal satisfaction in the fact that after all these years you regard emotional instability of sufficient importance to mention it in your discussion.

Now, Dr. Bargen, you asked earlier in conversation whether life insurance companies are insuring persons with a history of ulcerative colitis or of regional enteritis. The answer for my own company, and I am sure the same is true for many companies represented here, is yes. Our company has been issuing insurance to such persons for many years, usually substandard at first, but as time elapses, we have been able to give some of them standard insurance. Our results apparently have been good. However, as is generally known, ulcerative colitis and regional enteritis are two entirely different and unrelated ailments, so it is only natural that a sharp distinction prevails in our thinking about them from an insurance standpoint.

In anticipation of your talk to us here, I visited personally during the past week with Dr. E. T. Bell of the University of Minnesota, one of the nation's leading pathologists whose *"Textbook on Pathology,"* eighth edition, came off the press just last month. Dr. Bell had this to say, and he graciously agreed to let me quote him directly: "Ulcerative colitis is *ten times as serious* as regional enteritis. Regional enteritis is a nuisance disease apparently with almost no mortality. In fact, in 70,000 autopsies performed at the University of Minnesota not a single death proved to be due to regional enteritis. Surgery is usually the answer because the ailment does cause obstruction. However, nowadays the operative mortality is

practically nil." I thought this an extremely interesting statement from a man who is an undisputed authority in his field.

My congratulations and thanks again to you, Dr. Bargen, for your splendid presentation.

DR. SIMMONS — Continuing the program devoted to cardiovascular diseases, we are pleased to have the report of a statistical study evaluating the double Master test. The senior author is Dr. Frank J. McGurl, who graduated from the University of Pennsylvania. For three years he was Associate on the staff of the Cleveland Clinic, after which he was engaged in the private practice of medicine. Military service in the United States Navy with the rank of Lieutenant Commander interrupted this. In 1946 Dr. McGurl became Assistant Medical Director of the Prudential Insurance Company of America and he is now Medical Director of that Company at the Southwest Home Office, at Houston, Texas.

Dr. Raymond L. Dross, Assistant Medical Director, Prudential Insurance Company of America, collaborated in the preparation of the paper, "The Double Master Test — A Study on 247 Normal Men" which will be presented by Dr. McGurl. It is my pleasure to introduce Dr. McGurl.

THE DOUBLE MASTER TEST — A STUDY ON 247 NORMAL MEN

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and
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A number of years ago Master[1,2] studied large groups of normal individuals to determine the maximal number of ascents of two nine inch high steps which could be performed in 90 seconds, without unduly delaying the return of the pulse rate and blood pressure to normal. A return of the pulse rate and blood pressure to within 10 points of the resting record within two minutes after exercise was considered to be a satisfactory response. From these studies he constructed standard tables for normal individuals as a test for circulatory efficiency. These tables show the number of ascents to be made in 90 seconds. This number differs between men and women and varies with the weight and age of the individual.

In 1942 he applied the use of these tables to the electrocardiogram as a test for coronary insufficiency[3]. In the single test the prescribed number of ascents is made in 90 seconds, and in the double test twice this number is made in three minutes. An electrocardiogram is taken immediately on cessation of exercise and at suitable intervals thereafter. These tracings are then compared with a control tracing taken at rest prior to the test. To illustrate the amount of exercise involved, a 35 year old male who weighs 160 to 169 lbs. will go over these steps 22 times in 90 seconds in the single test, and 44 times in 3 minutes in the double test.

The other most commonly used functional electrocardiographic test is the Levy oxygen test,[4] better known as the anoxemia test. In this procedure the patient breathes 10 per cent oxygen and

90 per cent nitrogen for 20 minutes. Electrocardiograms are taken prior to and at 5 minute intervals during the test. If chest pain develops a record is taken immediately and at 1, 5 and 10 minute intervals. This test requires specialized equipment and is frequently complicated by very serious side reactions.

Other investigators do not perform any standardized amount of exercise but believe that the patient should exert himself until just short of chest pain[5] or until pain develops.[6] This is obviously a very dangerous procedure.

The Master test on the other hand is standardized, is relatively simple to perform, and if used with discretion is seldom complicated by untoward reactions.

Many studies have been done on patients with recognized cardiovascular disease and suspected cardiovascular disease using varying amounts of exercise and many different sets of criteria for an abnormal response,[5] but there are very few studies using Master's criteria which have been done on presumably normal subjects. For this reason we felt it would be of value to subject a group of presumably healthy adult men to a standardized exercise tolerance test. We used the criteria for an abnormal response as established by Master. These criteria are:[3]

1. Depression of the RS-T segment of more than 0.5 mm. below the isoelectric line.
2. Alteration from a positive T wave to a flat or inverted T wave.
3. A change from a previously inverted T wave to a flat or upright T wave.
4. Multiple premature beats, widening of the QRS complex, deep Q waves, prolongation of the P-R interval or heart block.

In Master's original study done in 1942[3] 65 normal adults had a single test and 34 had a double test. None of these had an abnormal electrocardiographic response to exercise. In 1950[7] he reported on the results of a study of 200 normal persons. For the first time abnormal responses were noted, both in the single and double test. By 1953[8] he had enlarged upon this group and reported on 311 subjects, both men and women. In this report

based solely on RS-T segment changes there were 3.2 per cent abnormal single tests, 7.1 per cent abnormal double tests, and 8 per cent abnormal either single or double tests.

It is well known that several extraneous factors can affect this test and at times produce an abnormal response.[9] Drugs such as thyroid and ephedrine, stomach distention from a heavy meal, undue excitement or emotional stress, anxiety neuroses or severe neurocirculatory asthenia; all of these may produce a positive response.

As far as it was possible to do so false positive tests were avoided by establishing suitable conditions for the conduct of the test and by careful screening of the subjects.

The group studied consisted originally of 304 men between the ages of 18 and 59, all of whom were our employees. Although they were carefully examined prior to the performance of the test closer scrutiny of their previous medical records at a later date forced us to eliminate 57 subjects. In this manner all those with a history of chest pain were excluded. These were studied as a separate group. Subjects with a blood pressure reading higher than 140/190 or with a history of blood pressures in excess of this level were eliminated. A few who had unquestionable functional murmurs and three with a remote history of rheumatic fever with no detectable murmurs were included.

The remaining group of 247 formed the nucleus of our study. None had any cardiovascular complaint or other pertinent medical history. Each had had one or more complete physical examinations and was free of any serious illness or evidence of cardiovascular disease. Their chest x-rays, resting electrocardiograms and routine laboratory studies were normal. To allay anxiety each subject was briefed on the purpose of the study. Over 80 per cent of them had had previous electrocardiograms in connection with periodic physical examinations. Without question, all were qualified for issuance of standard insurance.

Two highly trained technicians working as a team conducted the tests in an air-conditioned, semi-dark, quiet room. All electrocardiograms were taken in the recumbent position and were done at least one hour after meals. After the completion of a normal

resting 13 lead electrocardiogram, with the limb electrodes in place, the subject made the prescribed number of ascents for a double test in three minutes. Short strips not exceeding four to five complexes of leads I, II, III, V_4 and V_6 were recorded immediately after exercise and at 2, 5 and 10 minute intervals. The precordial electrodes were placed on areas of the precordium which were previously marked when the resting record was taken. In no instance was pain elicited nor was it necessary to discontinue the test because of unusual dyspnea, fatigue or distress of any kind. Each record was analyzed for the rate, RS-T segment deviation, P and T-wave alterations, QRS complexes, and disturbances in rhythm.

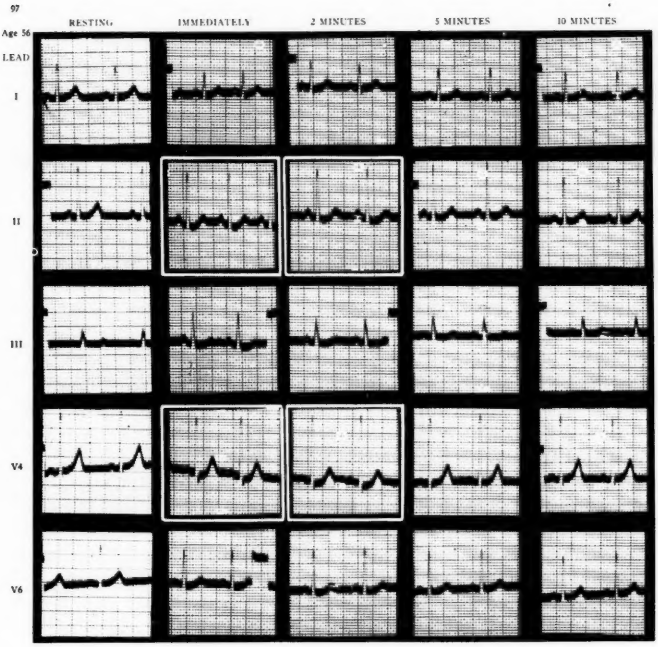

Fig. 1. Moderate depression of the RS-T segment in II in the immediate and two minute records and an abnormal depression of this segment in V_4 in the same intervals.

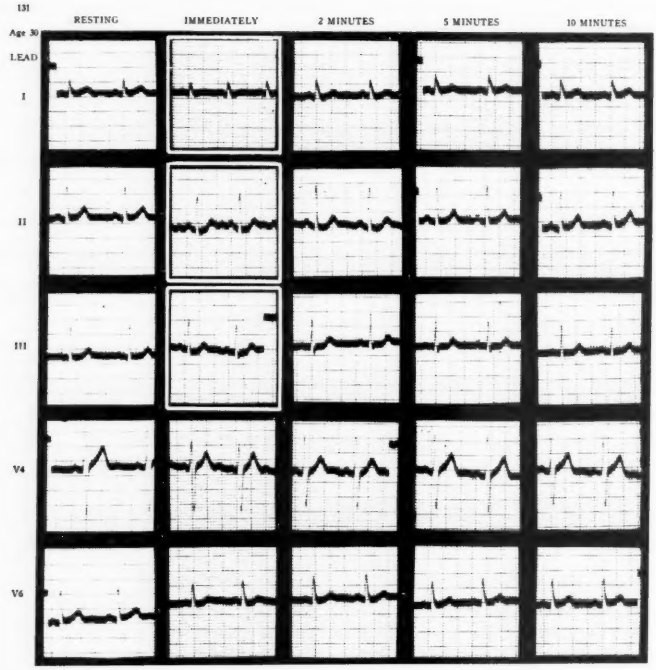

Fig. 2. Borderline T-wave changes in the immediate record in I, and RS-T segments changes in II and III.

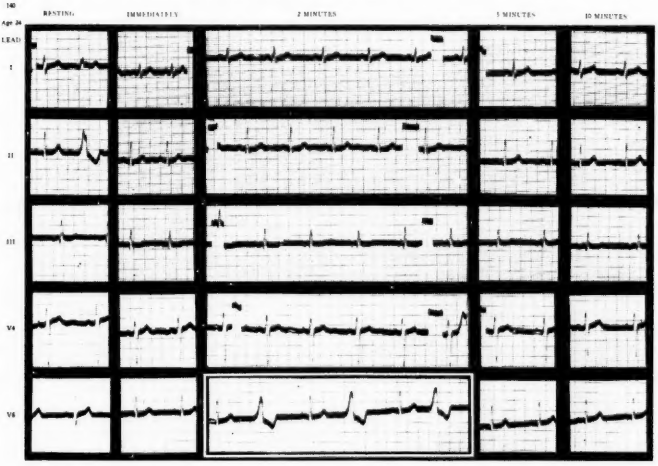

Fig. 3. Bigeminal rhythm in V_6 in the record taken two minutes after exercise.

Fig. 4. Bigeminal rhythm with ventricular premature beats in I in the immediate record and bigeminal rhythm with supraventricular premature beats in V_4 in the five minute record. The immediate record also exhibits a supraventricular beat in II, a ventricular premature beat in III and an interpolated premature beat in V_4. An isolated premature ventricular beat also appears in I in the two minute record.

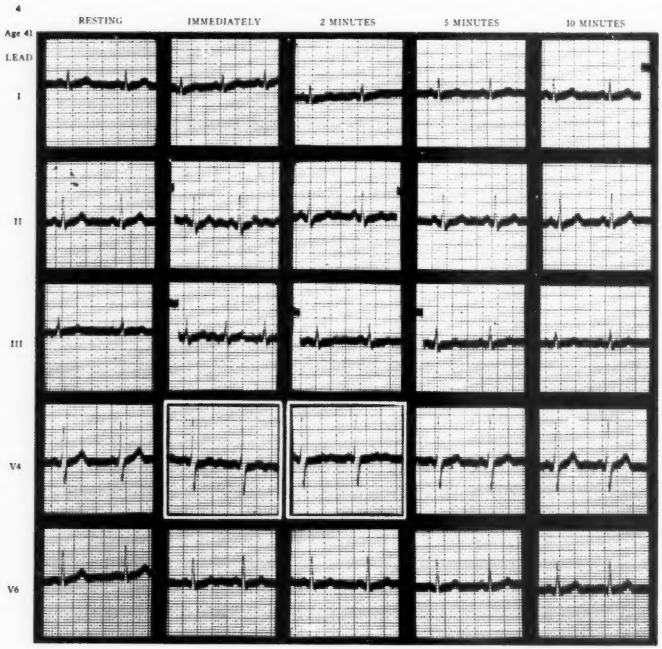

Fig. 5. In V_4 in the immediate and two minute records, the T-waves are low and notched. There is also a drop in T-wave voltage in I in the immediate and two minute records.

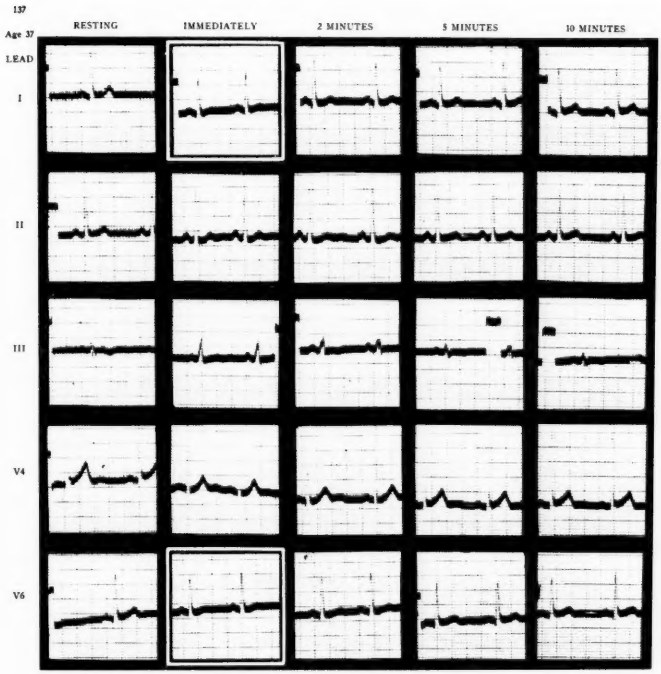

Fig. 6. In I and V_6 in the immediate record, the T waves are very low but not isoelectric.

Of the 247 studied there were ten abnormal responses (4 per cent). Six showed a depression of the RS-T segment (figure 1), two showed both RS-T and T-wave changes (figure 2), and two developed bigeminal rhythm (figures 3 and 4). There were no abnormal T-wave changes or other evidence of an abnormal response. A moderate number showed isolated premature beats after exercise which were not considered to be significant and consequently were not classified as abnormal.

In the group of eight who had RS-T segment changes, two had a depression of between 0.5 and 1.0 mm., and six had a depression of 1 mm. or more. The abnormal RS-T segment changes

occurred in six whose ages ranged from 24 through 35. The remaining two were 39 and 51. The bigeminal rhythm occurred in subjects aged 24 and 41.

In addition to those whose responses were clearly abnormal according to the above criteria, there was a group of thirteen (5.3 per cent) with borderline or questionable responses which should not be wholly ignored. Among these, nine showed notching of the T waves, marked lowering of the T waves, and in some, almost but not complete flattening of the T waves. There were four with RS-T segment depressions one of which had associated T-wave changes (figures 5 and 6). These were considered to be potentially abnormal or certainly borderline.

The RS-T segment depression occurs because the subendocardial region is more susceptible to anoxemia than the epicardium. It is farthest from the supply of oxygen and feels the lack of it quite readily. It has been shown[10] that lesions in the subendocardium produce depressions of the RS-T segment while those in the epicardium produce elevations. The subendocardial type of lesion is thought to be responsible for the electrocardiographic changes which sometimes occur in angina pectoris. Some investigators hold that a slightly elevated RS-T segment, if lowered to the isoelectric line after exercise, is an abnormal response. No changes of this nature were observed in this investigation.

Twenty-one subjects were removed from the study because of atypical chest pain. In each instance the examining physician felt that the pain was not cardiovascular in origin. Nineteen of these had normal exercise electrocardiograms, one was questionable, and one was definitely abnormal.

The Master test sometimes shows changes that are not as clearly defined as one might wish. If the record is slightly fuzzy and the depression is very little more than 0.5 mm. one cannot be absolutely certain of his measurement. In order to clarify one such case the exercise test was repeated with double standardization. When this was done the depression of the RS-T segment clearly exceeded 1.0 mm. In addition, the baseline may introduce a problem which can usually be solved by using the P-R interval as the point of reference. Deep broad S waves can also lead to confusion.

Some investigators have stated that there is a distinction between RS-T deviations due to tachycardia and those due to ischemia of the inner layers of the myocardium[11]. It is said that this distinction can be made by observing the contours of the depressed RS-T segments: a normal contour is said to show a rapid rise from the junction of the S wave to the T wave, while the abnormal one is described as flat or sagging. We found it very difficult to apply this interpretation. In this investigation the contour was not particularly helpful in judging abnormal responses.

It is our impression that most investigators still feel that the only true method of distinguishing the normal from the abnormal RS-T deviation is an empiric one based on the maximum RS-T deviation which can occur normally after exercise. However, much disagreement exists as to the kind and degree of exercise and what constitutes the upper limit of normal RS-T deviation.

Critics of this test have said that in normal people after exercise the auricular T wave (Ta) becomes more pronounced and may cause depression of the RS-T segment.[11] This results from tachycardia or increased sympathetic tone. However, the tachycardia to which they refer is infinitely greater in degree than that which occurred in this study. It is recognized of course that excessive exercise in itself may produce RS-T segment depressions in the normal individual.[11]

It is interesting to note the pulse rates recorded in this series of tests (table 1). The rate in the record taken immediately after exercise was determined in lead I which showed the maximum pulse response. In the other records the rate was determined in lead II. In a random sample of ten normal subjects whose ages approximated those of the abnormal ones the pulse rates in the 2 minute record all returned to within 10 per minute of the resting rate, while in the ten with abnormal responses only six returned to within 10 per minute of this rate. In all of these there is very little tachycardia even in the record taken immediately after exercise, and certainly none in the 2 minute record, although many of the abnormal electrocardiographic responses appeared in the latter record.

Others have felt that the RS-T depressions are due to changes

Table I

COMPARISON OF PULSE RATES IN TEN RANDOM NORMAL RESPONSES WITH THE ABNORMAL RESPONSES

Resting		Immediate		2 Minutes		5 Minutes		10 Minutes	
N	A	N	A	N	A	N	A	N	A
79	72	84	88	75	70	76	70	75	72
84	72	88	88	80	88	86	84	84	84
68	68	88	88	70	72	68	72	72	79
63	65	91	94	72	75	68	75	70	75
75	65	94	94	85	75	84	70	75	70
84	70	100	107	84	68	86	75	96	72
72	79	100	110	75	94	72	88	75	90
68	56	100	115	65	88	75	84	68	100
88	79	107	120	94	84	94	84	88	86
88	84	115	120	94	100	88	94	84	94

N — Normal
A — Abnormal

in blood chemistry as a result of exercise or hyperventilation.[12] No attempt was made to determine the degree of shift of the acid base balance since this was felt to be beyond the scope of this study. However, there was no objective evidence of dyspnea or muscular fatigue to suggest a chemical imbalance.

DISCUSSION: Is a negative two-step test a reliable indication of adequate coronary circulation? Master says that he excludes coronary insufficiency, organic or functional, if two tests are negative.[3] Conversely, is a positive two-step test indicative of coronary insufficiency? He feels that such a test is pathognomonic of interference with the coronary circulation although it does not necessarily mean organic coronary disease. In his opinion the insufficiency may be functional.

What does this group of abnormal responses represent? Do these people have coronary insufficiency? Are these responses a precursor of objective cardiovascular disease? There is no clear-cut answer to these questions. If one accepts Master's criteria of the abnormal then these are abnormal. But, whether they represent functional or organic changes only time and a proper follow-up study will give the answer.

SUMMARY:

1. Two hundred and forty-seven normal men were studied by the double Master test. Based on Master's criteria there were ten abnormal responses (4.0 per cent).
2. Thirteen subjects (5.3 per cent) showed borderline changes.
3. Of 21 subjects who were excluded from the study because of a history of atypical chest pain, believed not to be cardiovascular in origin, 19 had a normal double exercise test, one was questionable and one was abnormal.

In this study we gratefully acknowledge the valuable assistance of Miss Marjorie Stoddart, R.N., and Mrs. Wilma Hicks, R.T.

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DR. SIMMONS — Thank you, Dr. McGurl. Inasmuch as the next paper on our morning program is also a critical report on the value of the two-step exercise test, I am taking the liberty of withholding discussion on Dr. McGurl's paper until the close of the next paper, when each will be discussed.

Our next speaker began observation and research soon after joining the staff of the Metropolitan Life Insurance Company, which led to his appointment as Chief of the Cardiovascular Service at Walter Reed Army Hospital in Washington, D. C., in 1942. While there he started the use of the double two-step exercise and anoxemia test for the detection of coronary disease. The

groundwork for his presentation this morning was laid at that time and in succeeding years as consultant to the Walter Reed Army Hospital and the Surgeon General's Office he has had the opportunity to develop the present follow-up study.

Dr. Robb was signally honored by the Army in 1945 by being awarded the Legion of Merit.

Associated with Dr. Robb in the preparation of the paper are Mr. Herbert H. Marks, who is in attendance at the meeting and who needs no introduction to any of you; and Col. Thomas W. Mattingly, who unfortunately is not present at the meeting.

I take pleasure at this time in introducing to you Dr. George P. Robb, Assistant Medical Director, Metropolitan Life Insurance Company, who will address you on the subject of "The Value of the Double Standard Two-Step Exercise Test in the Detection of Coronary Disease: A Clinical and Statistical Follow-Up Study of Military Personnel and Insurance Applicants." Dr. Robb.

THE VALUE OF THE DOUBLE STANDARD TWO-STEP EXERCISE TEST IN THE DETECTION OF CORONARY DISEASE

A Clinical and Statistical Follow-up Study of Military Personnel and Insurance Applicants

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One of the most important problems in insurance medicine today is the detection of coronary artery disease in the applicant for life insurance. From our experience as insurance underwriters, we know that symptoms and signs of coronary disease will often be misinterpreted, minimized or omitted in the medical history given by applicants with various degrees of coronary impairment.

Coronary atherosclerosis begins insidiously and, once present usually causes progressive narrowing of the coronary arteries, coronary insufficiency, coronary occlusion and ultimately death. Detection of the advanced stages of the disease is not difficult in most cases. Detection of early coronary disease, however, before permanent myocardial damage has occurred, is often difficult or may be impossible by the conventional methods of physical and electrocardiographic examination. The only abnormality may be recurring chest pain. Even when this symptom is admitted by the applicant the diagnosis of coronary disease is far from certain. Typical constrictive chest pain, substernal in location and relieved by rest and nitroglycerin usually means coronary disease, but not always. In other cases of coronary disease the pain may be atypical, an aching, burning, sticking, or choking sensation, and not clearly related to the heart. Finally in a small number of cases

there are no symptoms, although the disease is well established and will progress.

A practical solution of the problem of detecting early coronary disease is urgently needed because of the increasing demand for large amounts of insurance for business or tax purposes by applicants in the fifth and sixth decades of life, the so-called "coronary age." In such cases incorrect underwriting decisions can be costly. Probably every medical director has experienced uncertainty in handling these applications for large amounts, and some times has guessed wrong or had close escapes.

A good example of the difficulty of selection in such cases is the experience with a recent applicant for insurance. This applicant, a wealthy 50 year old industrialist with a good family history, who had $150,000 Whole Life insurance, applied in August 1955 for $500,000. From the financial viewpoint he was eligible for this amount of insurance. The medical history was reasonably good. He had moderately advanced, healed tuberculosis, never treated, which was discovered nine years previously. There was no history of chest pain or other symptoms of cardiovascular disease. Physical examination at the Home Office was negative and the routine electrocardiogram was normal. The double two-step test, however, revealed an abnormal degree of S-T depression that was considered to be borderline ischemic in character. Because of this he was refused standard insurance, but was offered a substandard policy. It was not accepted by the applicant. Two days later — five weeks after the test — he had a severe coronary occlusion with massive myocardial infarction, followed by a second occlusion a week later. He escaped death, but he had a badly damaged heart. He is now uninsurable. In this instance the exercise test alone suggested the presence of coronary disease and prevented issuance of a standard policy.

The need for accurate clinical evaluation of the adequacy of the coronary circulation has been recognized for many years, especially when significant history may be suppressed, exaggerated, or created; when routine physical, x-ray and electrocardiographic examinations are inconclusive, and when administrative as well as clinical decisions must be reached regarding the individual's capacity for work and his prognosis. Because of this need, one

of us (GPR), while in military service, introduced the use of the double standard two-step exercise test in Walter Reed Army Hospital, immediately after Master first described the technic in December 1942.[1] His criteria of abnormal response to the test were used provisionally for interpretation at that time, but the need for their verification by means of a long term follow-up study was recognized. On the basis of experience with the test gained during World War II, one of us (GPR), recommended its use in the investigation of applicants for Ordinary insurance, and in 1949 the Metropolitan began to use the test in the Home Office. The test was used chiefly when coronary artery disease was suspected for some reason and less often when the amount of insurance applied for was large.

While stress tests have been used for more than two decades to obtain objective evidence on the adequacy of the coronary circulation, there is wide disagreement as to their value. Medical opinion varies from enthusiastic acceptance to complete skepticism. These varying opinions are based largely on impression instead of fact and reflect the unsatisfactory status, at present, of our evaluation of such tests. Ideally, the results of the exercise test should be compared with the status of the coronary circulation at the time of the test. Since, however, this is impracticable at this time, it has been necessary to use such compromises as comparison of the result of the stress test with (1) the clinical appraisal of the coronary status at the time of the test, based upon history, physical examination, resting electrocardiogram, and other laboratory studies, or (2) the subsequent rate of development of coronary disease, indicated by the occurrence of coronary occlusion or of death due to coronary disease, based upon follow-up observation.

This report deals with a clinical and statistical evaluation of the latter type based on long term observation made on two groups of persons who were suspected of having coronary disease and were given Master's double standard two-step exercise test: (1) 836 military personnel studied at Walter Reed Army Hospital, and (2) 379 applicants for Metropolitan insurance.

This type of investigation was undertaken originally (1) to appraise the accuracy of the double two-step exercise test in the

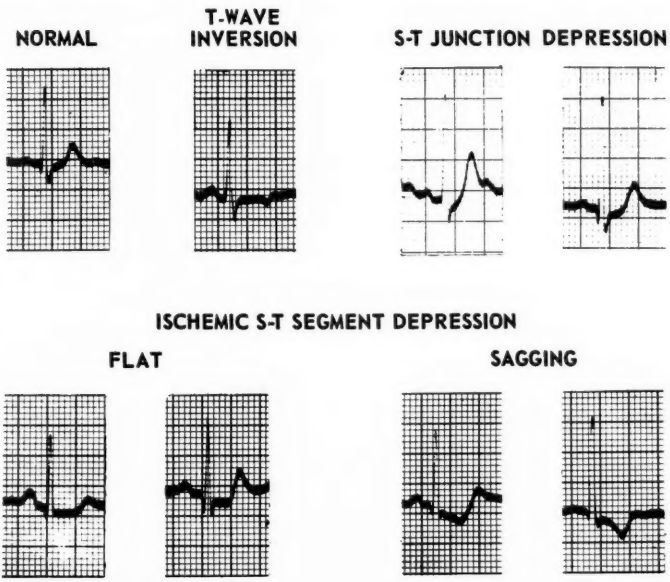
detection of coronary insufficiency, and (2) to test the validity of the Master criteria for an abnormal response to the exercise.

Procedures Used in Analysis of Data

The double two-step exercise test was performed exactly as described by Master[1], using his two-step stairs and his tables for the number of ascents to be completed in three minutes. The pre-exercise electrocardiogram consisted routinely of the 12 conventional leads, although there were some exceptions to this in the early cases. In the Walter Reed Army Hospital study, the post-exercise electrocardiogram consisted of four leads (bipolar limb leads I, II, III, and precordial leads V_4 or CF_4), made immediately, 3 and 8 minutes after completion of the exercise. In the Metropolitan Home Office study from 1949 to 1955, leads I, II, III

CHART 1

TYPES OF ELECTROCARDIOGRAPHIC RESPONSE TO DOUBLE TWO-STEP EXERCISE TEST



and $V_{3, 4, 5, 6}$ and often aV_L and aV_F, were made immediately and at 2 minute intervals thereafter for 10 minutes or until the electrocardiogram had returned to the preexercise state. During the past year 12 leads were used after exercise of which the precordial leads were recorded first and in reverse order beginning with V_6, and were followed by the unipolar extremity and the bipolar limb leads. In examinations made outside our Home Office, for practical reasons, leads I, II, III, V_4, and V_5, and recently V_6 were used routinely and were made immediately, 2, 5, and 10 minutes after exercise. The postexercise electrocardiograms were analyzed at the time of the test, and were rechecked independently during the study by two of the authors (GPR, TWM) before the results of the follow-up were known. Master's criteria for an abnormal response to exercise were used for interpretation, namely; (1) depression of the RS-T segment of more than 0.5 mm. below the P-R segment in any lead, (2) change from an upright T wave to an isoelectric or inverted T wave, or change in T wave in the opposite direction, or (3) occurrence of significant arrhythmia or heart block immediately after exercise.

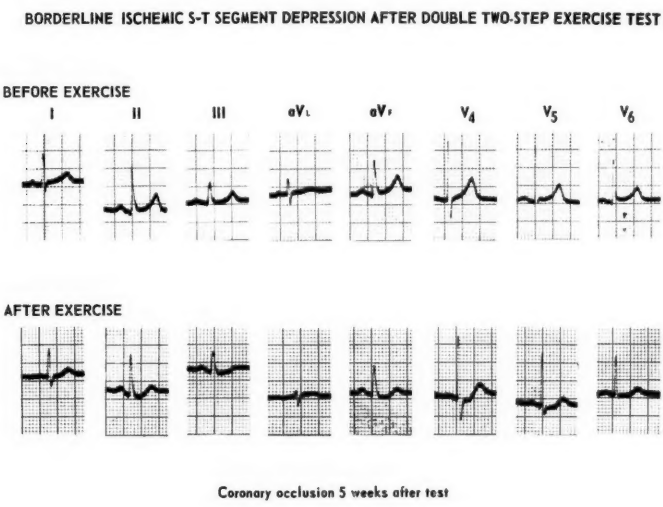
For statistical analysis the postexercise electrocardiograms were classified initially as positive or negative on the basis of Master's criteria, and in this paper the designations "positive" and "negative," without further qualification, will refer to the classification by his criteria. The positive cases were further classified according to the type of abnormal response into S-T depression and T-wave change groups, and the S-T positive group was subdivided into ischemic S-T segment and S-T junction depression groups[2, 3], in order to determine the relative importance of these criteria.

Various types of electrocardiographic response to stress are shown in chart 1. In the S-T junction depression type of response, only the point of junction of the preceding S wave and the S-T segment is depressed more than 0.5 mm. The S-T segment itself curves rapidly upward to the peak of a normal T wave. In contrast, in ischemic S-T segment depression the entire S-T segment is depressed horizontally or sags downward. Four varieties of ischemic S-T depression are shown in the chart. In the first two there is flat depression of the segment, one of slight and one of moderate degree; and in the last two there is sagging depression,

accompanied in one by a diphasic, and in the other by an inverted T wave. These several types of S-T segment depression may indicate different degrees of myocardial ischemia.

Chart 2 shows the electrocardiograms before and after exercise in the applicant for a $500,000 policy to whom reference was made earlier. The preexercise electrocardiogram was normal, but after exercise there was S-T junction depression of 1 mm. in V_4 and $_5$,

CHART 2

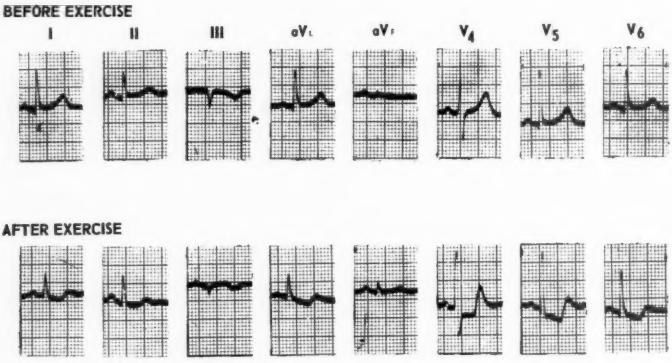


accompanied by some flattening of the S-T segment suggestive of ischemia. As stated earlier this man had a severe coronary occlusion five weeks later.

Chart 3 shows the electrocardiograms before and after exercise in a 55 year old man whose application for $200,000 was declined because of the findings on examination. Two years previously he had submitted a claim for angina under his Accident and Health policy, but at the time of the test he denied having had chest pain or heart disease. The physical examination was negative and the preexercise electrocardiogram was normal. After

CHART 3

ISCHEMIC S-T SEGMENT DEPRESSION AFTER DOUBLE TWO-STEP EXERCISE TEST



Coronary occlusion and death 15 months after test

exercise, however, there was a marked ischemic reaction, characterized by horizontal or sagging S-T segment depression in leads I, II, aV_L and V_{4-6}, accompanied by diphasic or inverted T wave of varying degrees. This type of reaction usually indicates the presence of intense widespread subendocardial ischemia. This man admitted no chest pain during the test. Only 15 months later this applicant died of acute coronary occlusion, six hours after admission to the hospital.

The data on the follow-up of the cases from the two sources were analyzed according to standard actuarial procedure to obtain mortality rates from all causes, and from coronary disease. For the Walter Reed series, computations were made also of the frequency of coronary occlusion, both fatal and nonfatal. In this series the diagnosis of coronary artery disease was based upon one or more of the following: (1) a documented clinical history of coronary occlusion with infarction supported by diagnostic or compatible electrocardiographic abnormalities; (2) sudden death, clinically diagnosed as a fatal acute coronary occlusion by the at-

tending physician or medical examiner, with or without necropsy confirmation; and (3) recurrent episodes of substernal pressure, discomfort or pain, induced by exercise, emotion or occurring with exertion after meals, relieved by nitroglycerin and diagnosed and treated by attending physician as angina pectoris. The statistical basis of measurement used were rates per 1,000 person years of observation. For the insurance cases computations were made also of actual to expected mortality, using the 1946-1949 Intercompany Basic Table as the yardstick. While a more contemporaneous experience might have been preferable, the volume of data available on the double standard two-step test cases did not warrant developing a new table. It may be noted, however, that in the range of ages and durations covered by this experience, the mortality among standard risks averaged 85 to 90 per cent of that expected by the Basic Table of 1946-1949.

Results of Analysis of Follow-up Data

A—Experience with Patients at the Walter Reed Army Hospital

These data relate to 836 cases age 30 or over who were suspected of having coronary disease and were given the double standard two-step test in connection with medical examinations at the Walter Reed Army Hospital between 1942 and 1951 and traced to the anniversary of the test in 1952. Supplementing this a limited amount of later information was available in some cases as late as June 1955. The clinical material was derived from the same source as the study reported in 1954 by Mattingly, Fancher, Bauer, and Robb[4] on 1,000 cases given the double two-step exercise test. In presenting the results of this analysis we shall follow the order, more or less, in which the ideas for analysis developed rather than the order of the relative importance of the various types of response to exercise that emerged from the study.

As table 1 shows, the test was done in 70 per cent of the cases because of chest pain. In about one-eighth of such cases the pain was designated as typical angina pectoris and in about one-twelfth coronary occlusion was suspected but not confirmed. In the remainder — about four-fifths — the chest pain was nonspecific in character. Some of the patients originally examined because of chest pain were not so identified, and were classified elsewhere,

because complete records were not always available. The next most frequent indication for the test, accounting for 14 per cent of the total, was an electrocardiographic abnormality suggestive of coronary disease. The most common were nonspecific S-T and T-wave changes (5 per cent of the total) and bundle branch block (4 per cent of the total). In only 7 cases was the electrocardiographic abnormality suggestive of myocardial infarction, and in only 5 cases was there a documented history of healed infarction. In the remaining cases, accounting for about 15 per cent of the total, there was a variety of reasons for making the test such as cardiac arrhythmia, exertional dyspnea and other cardiac or respiratory symptoms.

TABLE 1

INDICATIONS FOR DOUBLE STANDARD TWO-STEP EXERCISE TEST

Walter Reed Army Hospital Follow-up Study, 1942–1951

Indications	Number	Per Cent
Total	836	100.0
Chest pain or discomfort	585	70.0
a. Angina pectoris	69	8.3
b. Suspected coronary occlusion	47	5.6
c. Nonspecific	469	56.1
Myocardial infarction, healed, documented	5	.6
ECG abnormality suggestive of coronary disease	115	13.8
a. S-T and T-wave changes	43	5.1
b. Bundle branch block	35	4.2
c. Myocardial infarction	7	.8
d. Other	30	3.6
Hypertension	38	4.5
Cardiorespiratory symptoms	73	8.7
Other	20	2.4

Of the 836 cases, 607 were negative by Master's criteria and 229 were positive. Of these 229 cases, 99 had S-T segment depression of ischemic character, 42 had S-T junction depression, 80 had T-wave changes only, and 8 significant conduction abnormalities or arrhythmia. In about half of the 80 T-wave cases, an initially upright T wave became inverted after exercise; in the

remaining half, an initially inverted T wave became upright after exercise.

The age distribution was substantially the same in both the positive and negative groups (table 2). Approximately three-fourths of the subjects in each group were between 40 and 59 years of age, being almost equally divided between the fifth and sixth decades of life.

TABLE 2

AGE DISTRIBUTION OF ABNORMAL AND NORMAL REACTORS TO THE DOUBLE STANDARD TWO-STEP EXERCISE TEST

Walter Reed Army Hospital Follow-up Study, 1942–1951

Age at Test	ABNORMAL		NORMAL	
	Number	Per Cent	Number	Per Cent
All Ages (30 and over)	229	100	607	100
30–39	39	17	136	22
40–49	89	39	216	36
50–59	80	35	207	34
60 and over	21	9	48	8

Mortality and First Occlusion Rates

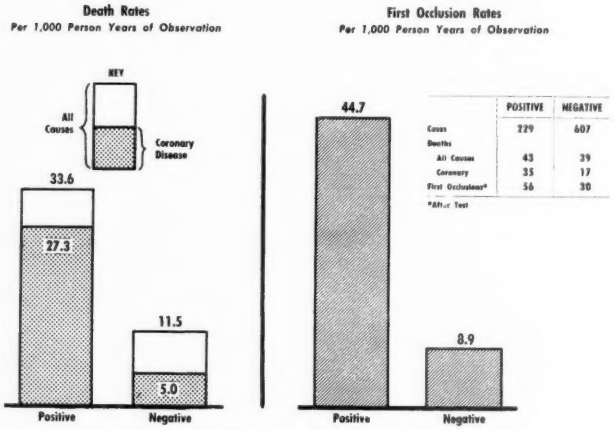
The comparative death rates in the positive and negative groups by Master's criteria from all causes, as well as from coronary disease, are illustrated graphically in chart 4. In this chart and in the similar charts to follow the left half of the chart is devoted to the death rates from all causes and from coronary disease. The death rate from all causes is represented by the total height of the bars including the shaded portion, and the death rate from coronary disease by the shaded portion only. The right half of the chart gives the first occlusion rates. The little inset table at the right gives the basic figures on cases, deaths and first occlusions for each category in the particular chart.

The death rate from all causes in the positive group was 33.6 per 1,000 or nearly three times that of the 11.5 seen in the negatives. The rate in the negative group, incidentally, was virtually

CHART 4

MORTALITY AND FIRST OCCLUSION RATES IN POSITIVE AND NEGATIVE REACTORS (MASTER'S CRITERIA)

Exercise Tests Performed in 1942-1951, Follow Up to 1952 Anniversary of Test



the same as that for adult males of comparable age in the general population[5].

Of particular significance were the differences between the positive and negative groups in the mortality rates from coronary disease and especially sudden deaths from acute coronary occlusion. The death rate in the positives from all coronary diseases was 27.3 per 1,000, as compared with only 5.0 in the negative group. For sudden deaths from coronary occlusion, the corresponding rates were 23.4 and 3.5 per 1,000, respectively, (see table 3). Thus, the death rate from coronary disease in the positives was more than five times that in the negatives, and from acute occlusion it was more than six times.

The relative frequency of first coronary occlusion after exercise in the positives and negatives, also illustrated in chart 4, indicates that this is the most sensitive measure of the reliability of the test in detecting coronary insufficiency. Between the date of the test and the 1952 anniversary, 56 of the 229 positives had suffered at least one occlusion, 27 of them fatal, and 29 nonfatal.

Of the cases with a nonfatal first occlusion, 13 had a recurrence, 8 of whom died. The rate of first occlusion in the positives was 44.7 per 1,000 as compared with 8.9 in the negatives.

The death rates by age groups, as well as the actual number of deaths from all causes, coronary disease and acute coronary occlusion, are given in table 3. All these rates rose steadily with age

TABLE 3

MORTALITY BY AGE AMONG ABNORMAL AND NORMAL REACTORS TO THE DOUBLE STANDARD TWO-STEP EXERCISE TEST

Cases Examined at Walter Reed Army Hospital, 1941–1952
Traced to Anniversary in 1952

Age at Test	ABNORMAL			NORMAL		
	All Causes	Coronary		All Causes	Coronary	
		Total	Acute		Total	Acute
	DEATH RATES*					
All Ages (30 and over)	33.6	27.3	23.4	11.5	5.0	3.5
30–39	15.9	15.9	7.9	7.2	3.6	1.2
40–49	26.5	22.4	18.4	14.4	5.6	4.0
50–59	43.9	37.0	34.6	9.3	5.6	4.6
60 and over	66.0	37.7	37.7	21.1	4.2	4.2
	NUMBER OF DEATHS					
All Ages (30 and over)	43	35	30	39	17	12
30–39	4	4	2	6	3	1
40–49	13	11	9	18	7	5
50–59	19	16	15	10	6	5
60 and over	7	4	4	5	1	1

*Based upon 1,000 person years of observations.

in the positives. The same tendency was apparent in the negatives, except that the rate at ages 40 to 49 was out of line because of the high death rate in this age group from noncoronary causes which accounted for 11 of the 18 deaths. In every age group the mortality among the positives was much higher than that among the negatives. The difference in the rates was greatest at ages 50

to 59 where the rate for the positives was nearly five times that for the negatives.

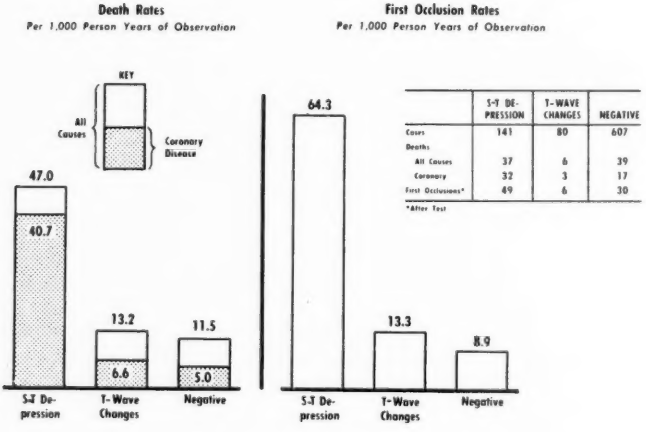
Evaluation of Positives According to Type of Response

The mortality rates from all causes and from coronary disease, and the coronary occlusion rates for S-T depression cases, T-wave change cases and negative reactors are shown on chart 5. The differences between the groups were striking; the S-T depression positives had far higher mortality and occlusion rates than the T-wave positives. The death rates from all causes in the S-T group was 47.0 per 1,000, as compared with 13.2 for the T-wave group and 11.5 for the negatives.

CHART 5

MORTALITY AND FIRST OCCLUSION RATES IN CASES SHOWING S-T DEPRESSION AND T-WAVE CHANGES AND IN NEGATIVE REACTORS (MASTER'S CRITERIA)

Exercise Tests Performed in 1942-1951, Follow Up to 1952 Anniversary of Test



	S-T DEPRESSION	T-WAVE CHANGES	NEGATIVE
Cases	141	80	607
Deaths			
All Causes	37	6	39
Coronary	32	3	17
First Occlusions*	49	6	30

*After Test

Even more striking were the differences between the two groups when the mortality rates for coronary disease and the rates of first occlusion after the test were compared. The coronary death rate in the S-T positives was 40.7 per 1,000, or more than six times the rate of 6.6 for the T-wave group. The rate for the nega-

tives was 5.0. The first occlusion rate for the S-T positive group was 64.3 per 1,000, but for the T-wave group it was only 13.3, and for the negatives, 8.9. The difference between the T-wave and negative groups is not statistically significant.

The patients with transient arrhythmia or conduction defects were too few in number to study statistically. However, none of these 8 died, but one suffered an occlusion.

Comparison of S-T Segment and Junction Types of Depression

Since we, like others, [2, 3] observed a difference in the clinical course of patients presenting an ischemic type of S-T segment depression, as compared to those presenting only S-T junction depression in their postexercise electrocardiograms, the experience in these two groups was analyzed separately. As already stated, there were 99 patients with ischemic type of S-T depression and 42 with only junctional type depression. The age distribution of these two subgroups is shown in table 4. The ischemic S-T depression occurred more frequently in those individuals over 50 years of age. They comprised 54.5 per cent of the entire group with S-T segment depression as compared with 40.5 per cent of the total with S-T junction depression.

Patients with ischemic S-T segment depression had a higher mortality rate from all causes and from coronary disease than did

TABLE 4

AGE DISTRIBUTION OF CASES WITH S-T SEGMENT AND JUNCTION DEPRESSION INDUCED BY DOUBLE STANDARD TWO-STEP EXERCISE TEST

Walter Reed Army Hospital Follow-up Study, 1942–1951

Age at Test	Segment Depression		Junction Depression	
	Number	Per Cent	Number	Per Cent
All Ages (30 and over)	99	100.0	42	100.0
30–39	14	14.1	10	23.8
40–49	31	31.3	15	35.7
50–59	44	44.4	13	31.0
60 and over	10	10.1	4	9.5

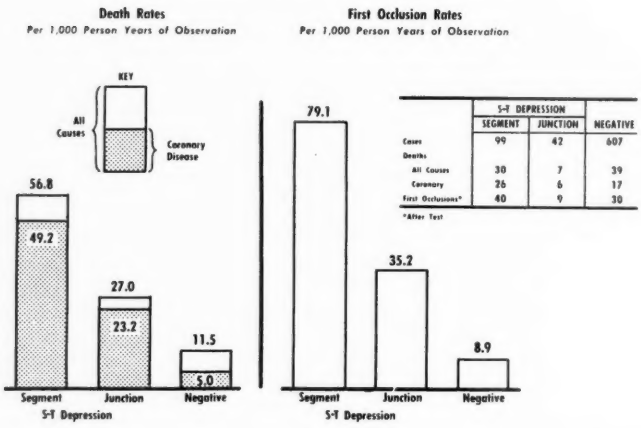
those having only S-T junction depression in their postexercise electrocardiograms (chart 6). The difference in death rates between the two groups was much greater than could be accounted for by the higher proportion of the older patients in the S-T segment group. There were 30 deaths from all causes in the 99 patients showing S-T segment depression, as compared with 7 in the 42 with junction depression. The death rate from all causes for the segment depression group was 56.8 per 1,000 as compared with 27.0 for the junction depression group and 11.5 for the negatives. The mortality rate for the S-T segment depression group was therefore twice that of the junction depression group, and five times that of the negatives. More significantly, the coronary death rate in the S-T segment group was 49.2 per 1,000 or more than double that in the junction depression group, and about ten times the rate of 5.0 found in the negatives.

The incidence of coronary occlusion was likewise markedly higher in the S-T segment than in the S-T junction depression

CHART 6

MORTALITY AND FIRST OCCLUSION RATES IN CASES SHOWING ISCHEMIC S-T SEGMENT AND S-T JUNCTION DEPRESSION AND IN NEGATIVE REACTORS BY MASTER'S CRITERIA

Exercise Tests Performed in 1942-1951, Follow Up to 1952 Anniversary of Test



	S-T DEPRESSION		
	SEGMENT	JUNCTION	NEGATIVE
Cases	99	42	607
Deaths			
All Causes	30	7	39
Coronary	26	6	17
First Occlusions*	40	9	30

*After Test

cases, with 40 or about two-fifths of the former having at least one occlusion, fatal or nonfatal, as compared with 9, or less than one-fourth of those with S-T junction depression. The frequency rate for first occlusions for the S-T segment depression group was 79.1 per 1,000, contrasted with a rate of 35.2 for the junction depression and 8.9 for the Master negative group. Thus, the first occlusion rate for S-T segment depression also was more than double the rate for junction depression and about nine times the rate for the negatives.

Results According to Indications For Test

In general, the indications for the exercise test were of comparatively minor value in predicting the final result, as measured by the mortality from coronary disease. As table 5 shows, there were substantial differences in the coronary mortality according to the indications for the test, but these differences reflect the relative frequency of abnormal response to exercise, especially of ischemic S-T depression. In every category of indications for the test the coronary mortality varied according to the response to exercise.

The coronary mortality was highest when the test was done because of a history of classic angina pectoris, with 17 such deaths among the 69 cases. However, 48 of these 69 had an abnormal response to exercise, with 35 showing ischemic S-T depression. In these 35 patients there were 14 coronary deaths as compared with only 1 death among the 21 negative reactors with angina pectoris.

In cases examined because of other types of chest pain — suspected coronary occlusion or nonspecific pain — the coronary mortality was low in the aggregate, but was very high in those with ischemic S-T depression. Thus, in patients tested because of suspected coronary occlusion, 3 of the 6 cases who showed ischemic S-T depression died from coronary disease, as compared with only 1 among the 36 with negative tests. Among the cases with nonspecific chest pain, 16 out of the 44 who had S-T segment depression died of coronary disease, but only 13 out of 369 negative reactors.

Physicians in insurance medicine will be interested to see what

Table 5

MORTALITY FROM CORONARY DISEASE IN RELATION TO INDICATIONS FOR EXERCISE TEST

Cases and Coronary Deaths in Patients Classified
According to Type of Electrocardiographic Response to Test
Walter Reed Army Hospital Follow-up Study, 1942-1951, Traced to Anniversary of Test in 1952
with Supplementary Information on Some up to June 1955

Indications	Total		Negatives		Positives							
					Total (Master's Criteria)		S-T Depression				T-wave Changes	
							Segment		Junction			
	Cases	Cor. Deaths	Cases	Cor. Deaths	Cases	Cor. Deaths	Cases	Cor. Deaths	Cases	Cor. Deaths	Cases	Cor. Deaths
Total	836	66	607	21	229*	45	99	36	42	6	80	3
Chest pain or discomfort	585	53	426	15	159	38	85	33	30	4	41	1
Angina pectoris	69	17	21	1	48	16	35	14	6	1	6	1
Suspected coronary occlusion	47	5	36	1	11	4	6	3	1	1	4	—
Nonspecific	469	31	369	13	100	18	44	16	23	2	31	—
Preexercise Electrocardiogram												
Normal	445	31	379	12	66	19	44	17	13	2	8	—
Abnormal	140	22	47	3	93	19	41	16	17	2	33	1
Myocardial infarction, healed, documented	5	2	3	1	2	1	1	—	—	—	1	1
ECG abnormalities suggestive of coronary disease	115	3	72	2	43	1	7	—	7	1	27	—
S-T and T-wave changes	43	1	21	1	22	—	3	—	1	—	18	—
Bundle branch block	35	1	24	1	11	—	1	—	3	—	5	—
Myocardial infarction	7	1	3	—	4	1	2	—	2	1	—	—
Other	30	—	24	—	6	—	1	—	1	—	4	—
Other	131	8	106	3	25	5	6	3	5	1	11	1

*Includes 8 cases with conduction abnormalities or arrhythmias.

happened when the sole indication for the test was an abnormality in the routine electrocardiogram. The experience generally has been good, but most of these patients had either a negative test or only T-wave changes after exercise. In 43 patients with nonspecific S-T and T-wave abnormalities before exercise there were only 3 with an S-T segment positive test, and only 1 coronary death. Among the 35 cases with bundle branch block as the indication for the test there was only 1 with ischemic S-T depression and only 1 coronary death. The experience was significantly worse, however, in cases with either documented history or electrocardiographic evidence of myocardial infarction. Of the 12 such cases, 3 have died of coronary disease.

What the preexercise electrocardiogram showed had relatively little bearing on the long term results. Analysis of the patients tested for chest pain, showed that the proportion with abnormal response to exercise was much higher in those patients with an abnormal resting electrocardiogram than in those with a normal tracing; for S-T segment depression specifically, the proportions were about 30 per cent and 10 per cent respectively. The coronary mortality, however, was similar for patients with the same type of response to the test. Thus, in the 44 patients with normal resting electrocardiograms who showed ischemic S-T depression on exercise, there were 17 coronary deaths, or 39 per cent. The coronary mortality is almost the same in the corresponding group with abnormal resting electrocardiograms, where there were 16 such deaths among the 41 patients. In the 13 cases with normal resting electrocardiograms who had S-T junction depression on exercise, there were 2 coronary deaths. The proportion was about the same in the corresponding group with abnormal preexercise electrocardiograms, with 2 such deaths among the 17 patients. Among the 379 cases with normal resting electrocardiograms and a negative exercise test, there were only 12 coronary deaths or 3 per cent of the total. In the corresponding group where the resting electrocardiogram was abnormal, there were 3 coronary deaths out of the 47 cases or about 6 per cent. The difference in coronary mortality between these two groups of negatives is relatively unimportant in comparison with the high rate in the S-T segment depression cases.

Status of Patients at Time of Last Follow-up

Of the 229 positive reactors, 57 or one-fourth had died up to June 1955. Coronary disease accounted for 45 of these deaths, but was present also in 85 or one-half of the living patients (table 6). Among the deaths in the positive group not due to coronary disease, autopsy showed the presence of severe coronary sclerosis in five cases as an incidental finding. Breakdown of the positives according to type of response showed that 42 or more than 40 per cent of those with ischemic S-T segment depression had died and 36 of these deaths were due to coronary disease, and of the 57 living cases, 42 or about three-fourths of them had coronary disease. In comparison, the proportion of cases dying up to June 1955 among S-T junction cases was 7 out of 42, or one-sixth; among T-wave cases, 8 out of 80 or one-tenth, and among the negative reactors, 52 out of 607 or one-twelfth. The proportion of deaths due to coronary disease and the proportion of the living with evidence of coronary heart disease were both far higher among patients with ischemic S-T segment depression than in all the other classes.

B — Experience with Applicants for Life Insurance

These data deal with 379 persons examined between 1949 and June 1955, who were traced to June 1956. Only tentative conclusions can be drawn from the data because of the limited number of cases and the short duration of follow-up. The results generally follow the pattern revealed by the Walter Reed Army Hospital experience. The great majority of the tests on applicants were performed because of suspected coronary disease, based for the most part on the history of chest pain, usually nonspecific in character. The usual source of the information was the medical history given by the applicant; less often, a previous insurance record. In a few cases the indication for the test was evidence of a previous coronary occlusion; in some, a record of an electrocardiographic abnormality suggestive of coronary disease; in a few others an adverse family history of cardiovascular disease; and in a small number the large amount of insurance applied for.

Of the total of 379 cases the postexercise electrocardiographic findings were interpreted initially as negative in 226, and positive in 153 patients. Of the latter 62 had S-T segment depression (of

Table 6

STATUS AT LAST FOLLOW-UP OF PATIENTS GIVEN DOUBLE STANDARD TWO-STEP EXERCISE TEST

Number and Per Cent of Patients Classified According to Type of Electrocardiographic Response to Test

Walter Reed Army Hospital Follow-up Study, 1942-1951, Traced to Anniversary of Test in 1952 with Supplementary Information on Some up to June 1955

Status at Last Trace	Negatives		POSITIVES							
			Total (Master's Criteria)		S-T Depression				T-Wave Changes	
					Segment		Junction			
	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
Total	607	100.0	229*	100.0	99	100.0	42	100.0	80	100.0
Living	555	91.4	172	75.1	57	57.6	35	83.3	72	90.0
Dead	52	8.6	57	24.9	42	42.4	7	16.7	8	10.0
Coronary disease	122	20.1	130	56.8	78	78.8	26	61.9	22	27.5
Living	100	16.5	85	37.1	42	42.4	20	47.6	19	23.8
Myocardial infarction										
Subsequent to test	18	3.0	19	8.3	11	11.1	3	7.1	4	5.0
Prior to test	13	2.1	7	3.1	3	3.0	2	4.8	2	2.5
Angina pectoris	39	6.4	45	19.7	26	26.3	11	26.2	7	8.8
Bundle branch block	24	4.0	13	5.7	2	2.0	3	7.1	6	7.5
Nonspecific ECG changes	6	1.0	1	.4	—	—	1	2.4	—	—
Dead	22	3.6	45	19.7	36	36.4	6	14.3	3	3.8
No known coronary disease	434	71.5	92	40.2	19	19.2	15	35.7	54	67.5
Cardiovascular status unkown	51	8.4	7	3.1	2	2.0	1	2.4	4	5.0
Per Cent Living who have coronary disease		18.0		49.4		73.7		57.1		26.4

*Includes 8 cases with conduction abnormalities or arrhythmias.

ischemic character in all but five instances); 75 had S-T junction depression; 15 had T-wave changes; and 1 had arrhythmia. As table 7 shows, there was a higher proportion of applicants aged 50 or over among those whose test revealed S-T depression of both types than in the negative reactors.

Table 7

AGE DISTRIBUTION OF APPLICANTS FOR LIFE INSURANCE GIVEN DOUBLE STANDARD TWO-STEP EXERCISE TEST CLASSIFIED BY TYPE OF ELECTROCARDIOGRAPHIC RESPONSE TO TEST

Metropolitan Life Insurance Company, Ordinary Department, 1949 to June 1955

Age at Test	Negative	POSITIVES		
		Ischemic S-T Segment	S-T Junction	T-Wave Changes
	PER CENT			
All Ages (20 and over)	100.0	100.0	100.0	100.0
20–29	2.2	1.6	2.7	6.7
30–34	8.4	4.8	6.7	—
35–39	15.9	9.7	12.0	20.0
40–44	25.7	17.7	21.3	20.0
45–49	22.1	24.2	18.7	33.3
50–54	16.8	22.6	24.0	13.3
55–59	4.9	11.3	10.7	—
60 and over	4.0	8.1	4.0	6.7
Number of Cases	226	62*	75	15

*Includes 5 cases of borderline ischemic S-T depression.

Altogether there have been 13 deaths in this experience, 6 of them among the negative reactors, 4 among those with S-T segment depression, 2 among those with S-T junction depression and 1 among those with T-wave changes. Among the negatives only 2 of the deaths were reported as due to coronary artery disease, but all of the deaths in the remaining groups were ascribed to that cause. Of the 4 noncoronary deaths in the negative group, 3 were due to malignancy and 1 to dissecting aneurysm of the aorta.

When the deaths were related to the years of life observed, shown in table 8, it was found that the death rate from all causes was about two and a half times as high in those with S-T segment depression than in those with negative responses and about twice

as high as in those with S-T junction depression. If comparison is limited to the coronary deaths, however, the rate in cases with ischemic S-T segment depression was 7 times as high as in those with negative response, and about twice as high as in those with S-T junction depression. The single death among those with T-wave changes yielded a very high death rate for all causes and for coronary disease, but the experience was too small to have much meaning.

TABLE 8

MORTALITY AMONG APPLICANTS FOR LIFE INSURANCE GIVEN DOUBLE STANDARD TWO-STEP EXERCISE TEST CLASSIFIED BY TYPE OF ELECTROCARDIOGRAPHIC RESPONSE TO TEST

Metropolitan Life Insurance Company, Ordinary Department, Applicants Tested 1949 to June 1955, Traced to June 1956

Type of Response	Death Rates per 1,000		Deaths	
	All Causes	Coronary	All Causes	Coronary
Negative	9.4	3.1	6	2
Positive				
Ischemic S-T Segment	22.9	22.9	4	4
S-T Junction	10.7	10.7	2	2
T-Wave changes	25.4	25.4	1	1

The ratios of actual to expected deaths, as measured by the Basic Mortality Table for 1946-1949 were 513 per cent for S-T segment depression cases, 286 per cent for S-T junction depression cases, and 287 per cent for those with negative response to the exercise test. The relatively high ratio for the negative cases primarily reflects the unduly large number of deaths from malignancy. Thus, by this measure of actual to expected mortality, which takes into account the differences in age distribution between the groups, the mortality for the S-T segment depression group was about 75 per cent higher than in either the cases with negative response or those with S-T junction depression. Data are not available on standard risks which would permit computation of ratios of actual to expected mortality for coronary disease alone, but if they were, the ratios for the S-T segment depression group would far exceed that for the other groups.

DISCUSSION

The ideal stress test would employ a critical level of stress which would provoke an abnormal response in the electrocardiogram of a patient with coronary sclerosis and latent insufficiency, but a normal response in one with adequate coronary circulation. Although this critical level varies in different individuals, it is necessary, for practical reasons, to use a standard amount of stress which will usually provoke pathognomonic changes in the electrocardiogram of the patient with latent coronary insufficiency and at the same time not endanger his health.

To date there has been no general agreement as to what constitutes the best method of provoking stress or the correct amount of stress. Various forms and amounts of stress have been used in testing the coronary circulation. Ordinary stair climbing was employed by F. C. Wood et al,[6] P. Wood et al,[2] and Scherf and Goldhammer.[7] The two-step exercise test was developed and standardized by Master et al,[1, 8, 9] and recently a standard one-step test was advocated by Simonson and Keys.[10] The anoxemia test was developed by Levy et al.[11] Walking on a treadmill was used by Erickson et al,[12] and Yu et al.[13]

At present there is no uniformity of opinion on what constitutes normal and abnormal electrocardiographic response to stress. This was brought out in the recent review by Scherf and Schaffer[14] of the various criteria for coronary insufficiency used in the interpretation of electrocardiograms made during stress. Although S-T depression and/or T-wave alteration have been included in most criteria for a positive test, there has been no agreement as to the amount of S-T depression that indicates abnormality. Little importance heretofore has been attached to the configuration of the depressed S-T segment, the significance of which was pointed out by P. Wood et al,[2] and Myers and Talmers.[3]

Master's criteria have been used widely in the interpretation of the two-step test performed for the evaluation of patients suspected of having coronary disease and as a screening procedure to detect coronary disease in apparently normal persons. These criteria have not been adequately tested because such an evaluation requires the follow-up of a large series of unselected consecutive cases for a long enough period of time in order to ascertain the

subsequent occurrence of coronary disease. As yet, this has not been done.

The present study attempts to meet this need. The validity of Master's several criteria for an abnormal response to exercise and the reliability of the double standard two-step exercise test in the detection of coronary disease have been appraised on the basis of the rate of development of overt coronary disease over a period of years subsequent to the test.

It was found that, as a group, the abnormal reactors by Master's criteria had a much higher rate of subsequent development of objective coronary disease than did the negative reactors. S-T depression, however, was the only dependable indicator of underlying coronary disease, because excessively high rates of coronary occlusion and coronary death occurred only in that group. Patients classified as abnormal reactors solely because of T-wave changes had surprisingly low coronary occlusion and coronary death rates, closely approximating those of the negative group.

Further investigation, according to type of S-T depression, showed that the increase in coronary occlusion rates and death rates from coronary disease occurred predominantly in the subgroup that experienced ischemic S-T segment depression. Those showing only S-T junction depression had considerably lower rates. These findings are in accord with the concept that flat or sagging depression of the S-T segment after effort denotes myocardial ischemia, [2, 3, 20] whereas transitory depression of the S-T junction of any degree occurs normally after effort and is due usually to physiologic changes associated with tachycardia or effort, or, in some cases, due to the effect of a large negative atrial T wave.

In the S-T junction depression group, the coronary occlusion rates and the mortality from coronary disease were considerably higher than would be expected if S-T junction depression was a normal reaction to effort. The reason cannot be determined from this clinical material, but there are two likely explanations. The first and more commonly applicable, based on the work of Myers and Talmers[3] and our own later experience, is that the electrical forces responsible for ischemic S-T segment depression probably occurred at other points on the precordium in addition

to those causing the S-T junction depression recorded in the electrocardiogram, but this ischemic depression in the postexercise electrocardiograph was missed because only one precordial position, V_4, was used routinely, as originally recommended by Master.[1] Since 1942, when this work was begun, advances in electrocardiography made it clear that the single precordial electrocardiogram gives an incomplete record of the significant electrophysiologic events which occur in the septum and free wall of the left ventricle. The second explanation, probably applicable in fewer cases, is that the S-T junction depression that persists for several minutes after the accelerated heart rate induced by the exercise has slowed down to about normal is the result of slight myocardial anoxia. The degree of anoxia, however, is insufficient to cause ischemic S-T segment depression.

The results based on the long term follow-up obtained in the present study do not confirm the extremely high correlation between positive tests and coronary disease reported by Master et al[15] on the basis of a short term follow-up of 150 patients. This holds true even when, in the present study, the requirement for abnormal response indicative of coronary insufficiency was reduced to ischemic S-T segment depression and the requirement for the diagnosis of coronary disease was limited to coronary occlusion or coronary death. Actually, the validity of the exercise test does not require perfect correlation on a short term basis between the presence of clinical coronary artery disease and a positive test.

Clinical coronary artery disease includes a wide range of coronary narrowing, varying from minimal to severe degree, and various degrees of myocardial damage, ranging from reversible injury to extensive myocardial destruction with scar replacement. The exercise test is capable only of detecting the presence of latent coronary insufficiency by its production of myocardial ischemia and distinctive electrocardiographic changes. The test has no such effect on electrically inactive scar tissue. Whether or not a person with coronary artery disease has a positive exercise test depends upon the presence or absence of sufficient coronary narrowing, diminished coronary blood flow, and latent coronary insufficiency to produce myocardial ischemia on exercise. In the

majority of instances of clinical coronary artery disease in which there are symptoms or electrocardiographic manifestations of coronary insufficiency, the exercise test will be positive. In some instances of severe coronary disease evidenced by previous coronary occlusion, however, the test will be negative, since the remaining myocardium is adequately supplied with blood and so fails to develop ischemia on exercise. Also, in rare cases, the exercise test may be positive in the absence of other clinical evidence of coronary disease, because the degree of coronary narrowing is slight and the transitory ischemia induced by the test, and other effort, has not yet caused irreversible myocardial damage that may be detected in the electrocardiogram at rest.

On a long term basis, there should be close correlation between a positive exercise test and the development of clinical coronary artery disease, because the arteriosclerotic process, once present, usually causes progressive narrowing of the coronary arteries, and, eventually, permanent myocardial damage. The appearance of overt coronary disease subsequent to a positive test may require many years. Thus, early high correlation on a percentage basis between positive exercise test and clinically evident coronary disease need not be expected, nor did it occur in this study.

The results of the follow-up study of the Walter Reed Hospital indicate that Master's criteria for an abnormal response, especially isolated T-wave change and transitory junctional S-T depression, are too inclusive and their usage results in the overdiagnosis of coronary disease. There is some indication of this in the experience on life insurance applicants also. Moreover, in studies of normal groups [16-20] which have been followed up for extended periods of time, an abnormal response by Master's criteria has been reported in as high as 25 per cent of the cases studied. These findings indicate that use of Master's criteria produce a large percentage of false positives, and accordingly, all of his criteria cannot be considered reliable in the detection of coronary disease. The most valid is S-T segment depression of ischemic character which exceeds 0.5 mm.

SUMMARY

A clinical and statistical evaluation of the double standard two-step exercise test was made on 836 patients with suspected coronary

disease examined at Walter Reed Army Hospital and on 379 applicants for life insurance. The Walter Reed Hospital patients were first observed in 1942 to 1951 and traced to 1952. The primary basis of the evaluation was the frequency of occurrence of coronary occlusion and death from coronary disease in the follow-up period.

Among the 229 patients classified as abnormal by Master's criteria, the death rate was 33.6 per 1,000 person years of observation or nearly three times that of 11.5 for the 607 cases with normal test response. The death rate from coronary disease in the positive group was 27.3, but only 5.0 in the negative group. For acute occlusion, the corresponding rates were 23.4 and 3.5 per 1,000.

In patients with S-T depression, the death rate was 47.0, as compared with 13.2 in those with T-wave changes. The death rates from coronary disease were 40.7 and 6.6 respectively, and the rates of first occlusion after test were 64.3 and 13.3 respectively. Further detailed analysis of the S-T depression group showed that individuals with ischemic S-T segment depression had a total death rate of 56.8 per 1,000 as compared with 27.0 for those with S-T junction depression. The coronary death rates were 49.2 and 23.2 respectively, and the occlusion rates were 79.1 and 35.2 respectively.

In the brief experience on insurance applicants, the death rates from all causes and from coronary disease were highest in cases with S-T segment depression — 2½ and 7 times as high, respectively, as in cases showing normal response to the test.

CONCLUSION

1. The Double Standard Two-Step Exercise Test is a dependable method of detecting occult coronary sclerosis. It imposes sufficient stress to produce detectable myocardial ischemia in most cases of coronary narrowing with latent coronary insufficiency.
2. The best and the only unequivocable criterion for a positive test indicative of coronary insufficiency in the postexercise electrocardiogram was found to be ischemic S-T segment depression in excess of 0.5 mm. in any lead.

3. Transitory S-T junction depression after exercise associated with tachycardia is usually a normal finding. S-T junction depression that persists several minutes after exercise and the return of the heart rate to normal may be due to myocardial ischemia in some cases.
4. Isolated T-wave alterations in the postexercise electrocardiogram are not valid evidence of coronary insufficiency.
5. A negative response to the double two-step exercise test excludes, for practical purposes, the presence of latent coronary insufficiency and clinically significant narrowing of the coronary arteries.
6. The double two-step test, properly performed and properly interpreted, is of definite help in the diagnosis of coronary artery disease.

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DR. SIMMONS — I now invite discussion of the papers presented by Dr. McGurl and Dr. Robb. In order to keep our records properly would you kindly, in rising to discuss these papers, indicate your name and company, and if you have questions to ask indicate to which essayist the question is directed. Is there discussion of the papers?

DR. MILTON HENRY CLIFFORD — I think in the first place we all realize what we have heard this morning in these two papers, these extraordinarily magnificent papers for our purpose, is going to affect our underwriting and our thoughts on procedure very profoundly. Any mature discussion or conclusion must be deferred until after we have studied them over considerably. I am sure that we are all going to be talking about the subject later today.

Certainly there are two or three things that come to mind. One is that we do not have all these tests done in the home office. They are done all over the country with all kinds and varieties of technics in doing them.

The other item is one that I am a little hesitant to raise. I would be grateful for comments on the dangers while the test is being done, not only to the individual, but also to the individual who has the legal liability, the person doing the test or the person authorizing the test.

DR. SIMMONS — Are there other discussers?

DR. HARRY E. UNGERLEIDER — I was particularly glad to hear Dr. McGurl's paper, because during the war Dr. Duhigg, Dr. Gubner and I made electrocardiograms on candidates for officers in the Navy, and we found many of these changes. We were impressed by the number of these changes that appeared in young boys aged 19 to 26, and at that particular time we thought there were too many positives in our group. Therefore we began to doubt the validity of the whole test. Nevertheless, there are other people who told us there was merit in the test and we ought to go back, which we did, and found that in the young men — practically in every one of them — we could duplicate these S-T changes simply by hyperventilation. In the older candidates, however, we could not do so. I was very glad to see Dr. McGurl point out this because I believe that some of these borderline tests are normal — tachycardia can do it and hyperventilation can do it. This raises one more point, and that is, make sure that your patient is not the hyperventilation type before you attribute the diagnosis of coronary disease to him.

DR. SIMMONS — Thank you, Dr. Ungerleider. Is there further discussion?

DR. D. SERGEANT PEPPER — I also want to compliment both of these authors for these remarkably good papers. Our Chairman's remark earlier about being left speechless is really almost true. The amount of data presented is so great that it is very difficult to consider it at this time. We are doing these tests in the Home Office and trying to interpret the ones that come in from the field, and we find it very difficult, as Dr. Clifford does. And I would also like to make a plea for standardization of methods of doing the tests, the timing of the electrocardiograms after exercise, and the leads used. It certainly is done very differently throughout the country.

DR. SIMMONS — Thank you, Dr. Pepper. Are there other discussers? Any questions?

DR. PAUL H. LANGNER, JR. — I would just like to say that I am glad to hear these results. I was with Dr. Robb in his department at Walter Reed, and I have been waiting ten years to find out what he was going to tell us about these tests, but we have been doing the test since about 1950, both in the Home Office and in the field, and we are very happy with it in general. I think the thing that bothers us most is when you have an unstable base line, especially when the base line slopes downward, I think it is very difficult to read, and I would like Dr. Robb's and Dr. McGurl's comments on that point, but I certainly think it is too difficult to evaluate unless there is a fairly good, straight, stable base line.

DR. SIMMONS — Are there others? We still have a few minutes for questions, if you have other questions to ask or other comments to make.

DR. ROBB — I will attempt to answer Dr. Clifford's questions, with Dr. McGurl's permission. We have had no deaths following the test in my Army and insurance experience that now comprises over 1,000 cases, most of whom were suspected of having coronary disease. Early in 1943, as happens so many times with new technics, we had a few unpleasant experiences. Three patients developed T-wave inversion that persisted for several days after the test and were diagnosed as small intramural infarctions. However, since then we have had no other adverse affects and no

deaths although, exceptionally, the ischemic changes induced by the test have lasted for 10 or more minutes.

Before using the double two-step exercise test for study of Metropolitan insurance applicants, the question of legal liability was investigated by the Company's Law Division. Because this test was an accepted clinical test, the Law Division approved its use in the examination of insurance applicants and stated that the Company would be obliged to assume legal liability for the tests performed at the Home Office and by Medical Examiners in the field. Fortunately there have been no law suits against Metropolitan thus far. If the tests are carried out with reasonable judgment and according to standard technic, it can be accepted as a safe working rule that ill effects, especially coronary occlusion or coronary death, will not be precipitated by the test. The heart is a remarkably tough organ and usually it will not become damaged by the moderate amount of exercise imposed by the double two-step test.

DR. SIMMONS — I believe there was one other point raised by Dr. Pepper on standardization. Do you want to comment on that?

DR. ROBB — We think that the double two-step exercise test should be used as the standard test and only in exceptional cases should the single test be performed first. Early in 1943 at Walter Reed Hospital we used the single and the double two-step exercise test and the anoxemia test on the same person, to find out which test was the most practical and reliable for standard use. Several cases of coronary occlusion that occurred within a few months after a positive double two-step test and a negative single exercise test and anoxemia test indicated quite convincingly that the double two-step test was the most reliable stress test. We, therefore, adopted the double exercise test as the routine stress test. The single test does not impose enough stress in the average person to bring out latent coronary insufficiency, so a negative single test is of no value; a negative double two-step test, however, is good evidence that significant coronary narrowing is absent.

In the field we have had many tests performed, with generally good results. We have been careful in the selection of our Examiners for the exercise test, and, when possible, we use those who have had experience with the test, who are certified in In-

ternal Medicine, and who are young and flexible enough to learn new technics. We use a form letter that tells exactly how to perform the test. A preliminary 12 lead electrocardiogram is made, and, if it shows no evidence of recent myocardial injury, the test is performed exactly as described in the form letter. The judgment regarding the significance of the preexercise electrocardiogram is left up to the Examiner. After the exercise, the applicant lies down quickly on the table and relaxes and the postexercise electrocardiograms are made immediately, two, five, and ten minutes after exercise. Because ischemic changes usually do not persist for five minutes after the exercise but are often present at four minutes, we plan to have the electrocardiograms in the field made immediately, two, four, seven, and ten minutes after exercise. It is always helpful to the interpreter to find evidence of ischemia in more than one of the electrocardiograms made after exercise, particularly in the barely positive case.

DR. ANDERSON — How much do you pay for that?

DR. ROBB — Twenty-five dollars is our standard fee for the uninterpreted exercise test. If there are any additional examinations required, we pay an extra fee.

DR. PEPPER — What leads are used?

DR. ROBB — Leads I, II, III, and $V_{4, 5}$, and $_6$ have been used routinely by the Examiners in the field for postexercise electrocardiograms. At a recent conference on exercise tests at Walter Reed Hospital it was decided that, for practical purposes Leads V_6, V_5, V_4, V_1, aV_R , aV_L , and aV_F should be recommended as standard for general use. For the field we plan to use these leads with one change, namely, Lead II will be substituted for V_1. At the Home Office for the present we take all 12 leads after exercise. In general, the information from leads $V_{4, 5}$, and $_6$, and the three limb leads, either unipolar or bipolar, will cover the great bulk of cases adequately and not much of importance will be missed.

As to the wandering base line mentioned by Dr. Langner, I have had considerable experience with this annoying problem. It may be caused by high patient resistance due to insufficient rubbing of the skin with electrode jelly before applying the elec-

trode, to a film of oil on the skin, or to poor contact between the skin electrodes and the patient lead tips or between the proximal end of the patient lead (cable) and the electrocardiograph. So the physician or technician is instructed to rub the skin vigorously with electrode jelly, and to clean the terminals at both ends of the patient lead and the contacts on the skin electrodes with sandpaper. Occasionally it may be necessary to use rubbing alcohol to remove oil from the skin and decrease patient resistance. These measures usually yield a stable base line and well defined waves and complexes that are suitable for interpretation.

The effect of hyperventilation on the S-T segment was not investigated specifically in this study, so we have no final answer to Dr. Ungerleider's question. It is clear from other investigators' experience that hyperventilation may produce S-T junction depression in normal persons, but it seems unlikely that it will cause ischemic S-T segment depression.

DR. SIMMONS — Thank you Dr. Robb.

Dr. McGurl, we would be glad to have you add anything you might wish to the discussion.

DR. MCGURL — No, thank you, Dr. Simmons.

DR. SIMMONS — I feel that we are extremely fortunate in the selection of our next speaker and his subject, since he is not only eminently qualified in his special field of Pathology, but can claim considerable distinction for his research and observation in the general field of cardiovascular diseases. Additionally our speaker may be known to some of you for his contributions in the field of blood plasma regeneration and the function of the lymphatic system or perhaps the arteries on the treatment of arterial disease.

I take great pleasure at this time in introducing to you Dr. Russell L. Holman, Professor and Head of the Department of Pathology, Louisiana State University, who will speak to you on the subject of "The Natural History of Atherosclerosis." Dr. Holman.

THE NATURAL HISTORY OF ATHEROSCLEROSIS

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In view of current vital statistics, atherosclerosis may justifiably be regarded as the top-ranking public health problem in the United States at the present time. Despite the vast amount of investigative activity directed toward this problem in recent years, some of the most fundamental aspects of atherosclerosis remain an enigma. For example, a wide diversity of etiologic factors have been considered, but as yet there is no convincing evidence for any one factor or combination of factors to the exclusion of others in naturally occurring human atherosclerosis. Diet, genetic constitution, age, sex, intravascular pressure, and endocrinopathies are among the factors which have been suggested by various studies on both human atherosclerosis and lesions resembling atherosclerosis produced in animals.

One of the many difficulties inherent in the study of human atherosclerosis is the fact that the presence of the lesions cannot be detected and their severity cannot be measured quantitatively in an individual patient unless the patient either dies or develops symptoms related to the lesions. A diagram recapitulating some of the current concepts regarding atherosclerosis is depicted in figure 1. The first distinctive and recognizable lesion of atherosclerosis is the atheromatous plaque, which by definition contains a mixture of lipids, principally cholesterol and its esters, phospholipids, and neutral fats. Except perhaps in rare instances, atheroma does not progress directly to disease, but undergoes a series of changes resulting in the accumulation of hyaline connective tissue over and about it, to form a fibrous scar penetrated by blood

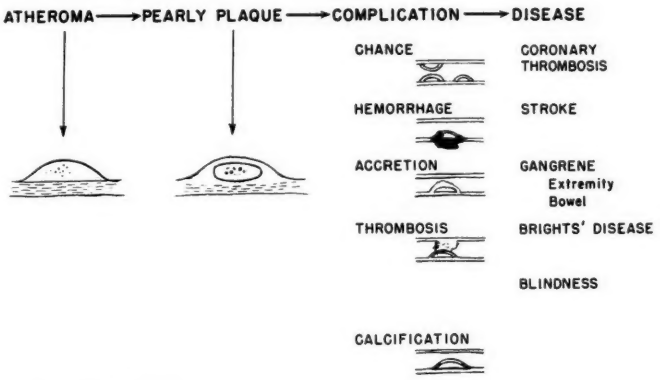


Fig. 1. Diagram of some current concepts of atherosclerosis.

vessels. The patient is still not aware of this process, however, until certain additional complications take place to produce obstruction of the arterial lumen or weakening of its wall, resulting in ischemia or hemorrhage, and finally in loss of function of the organ supplied by the artery involved.

It seems quite possible that the complications in atherosclerotic lesions may be precipitated by factors entirely unrelated to the factors which influenced the development of the original atheroma. Studies of atherosclerosis involving living patients must depend on measurements of an effect several steps removed from the basic lesion fundamentally responsible — that is, they depend on measurement of interference with the function of the organ whose arterial system is affected. Such studies may be quite valuable when applied to the prevention or treatment of the manifest disease, but they may be only indirect and remote indices of the past history of the lesions of atherosclerosis.

Another approach to the problem of atherosclerosis is to study the lesions of atherosclerosis themselves, and particularly to accumulate accurate and detailed information concerning the exact sequence of events that takes place in an atheromatous plaque. Since a plaque can be observed only once, this must be done by observing a large number of minor variations and reconstructing the probable order in which these variations take place. Such

studies are in practice limited to the examination of necropsy material or to series of experimental animals. With respect to experimental animals, the entire gamut of changes seen in human atherosclerosis progressing from lesions to disease, has not yet been produced. Likewise, the applicability to humans of the results of those experimental vascular lesions which have been produced in animals is not clearly established. For the time being, therefore, the study of human lesions must be continued.

Still another approach to the problem of atherosclerosis is the attempt to measure the degree of severity of the lesions, or the prevalence and severity of the various types of lesions, in a given population sample in order to establish a base line of expectancy for each age, sex, and racial group in that population. It is possible that such studies might lead to recognition of variations in severity of lesions associated with environmental factors, as well as establish differences related to age, sex, and race. Such a base line would serve as a standard for assay of proposed preventive or therapeutic measures in groups of patients in the future. If the same criteria were employed to evaluate the severity and incidence of such lesions in other population groups in other geographic areas, particularly in countries with different dietary habits and genetic constitution, some indication might be gained concerning the relative importance of such differing factors in the etiology of atherosclerosis. Furthermore, analysis of the severity of the various types of atherosclerotic lesions at successive ages and in various portions of the vascular system would contribute to our understanding of the life history of a single atheromatous plaque. Some evidence bearing on the reversibility, and possibly on the limits of reversibility, might be accumulated.

Such an investigation characterized by quantitative aspects can be performed only on specimens obtained at necropsy, since it requires direct visualization of a significantly large proportion of the vascular system.

We have selected the aorta as that portion of the vascular system to study. The reasons for choosing this vessel, which only rarely is involved in producing clinical disease, rather than other vessels such as the coronary arteries or cerebral arteries, for example, are as follows:

(1) The aorta is dispensable at autopsy and can usually be obtained from the prosector easily, since there is little clinical significance to its condition. A compromise on what can be reasonably and consistently collected must be made when necropsies are performed by a number of different prosectors in a large institution.

(2) The aorta offers the largest endothelial surface within the body for direct examination and observation. Various stages and degrees of involvement with lesions can be more readily and accurately determined with this large area.

(3) The basic lesions in the aorta and in the arterial branches which commonly cause disease are identical in their gross, histological, and histochemical appearance, so that it is reasonable to assume that the processes producing these lesions are the same. Isolated instances of disparity between severity of lesions in the aorta and coronary arteries have been pointed out, but we have never observed atherosclerotic lesions in the arterial branches without some degree of involvement of the aorta. Furthermore, it seems to be a reasonable working hypothesis that if we could prevent or cause reversal of aortic lesions, we could at the same time prevent or cause reversal of coronary, cerebral, femoral, or mesenteric arterial lesions. It is clearly recognized by all that these latter lesions are by far the most significant in the production of clinical disease, in contrast to the uncommon clinical manifestations of aortic atherosclerosis.

The studies along this line which have been conducted at Louisiana State University School of Medicine for the past seven years may be divided into two parts. The first, performed in 1949-50, consisted of an analysis of aortic atherosclerosis in 300 aortas obtained from necropsies on patients of all ages. The second study, provoked by certain findings in the first, was concerned primarily with quantitative analysis of the early lesions of atherosclerosis in over 900 aortas in the age group of 1 through 40 years.

Materials and Methods

From July 1, 1949 to July 1, 1950, a total of 558 necropsies were performed on the Pathology Service of the Louisiana State University School of Medicine at Charity Hospital of Louisiana,

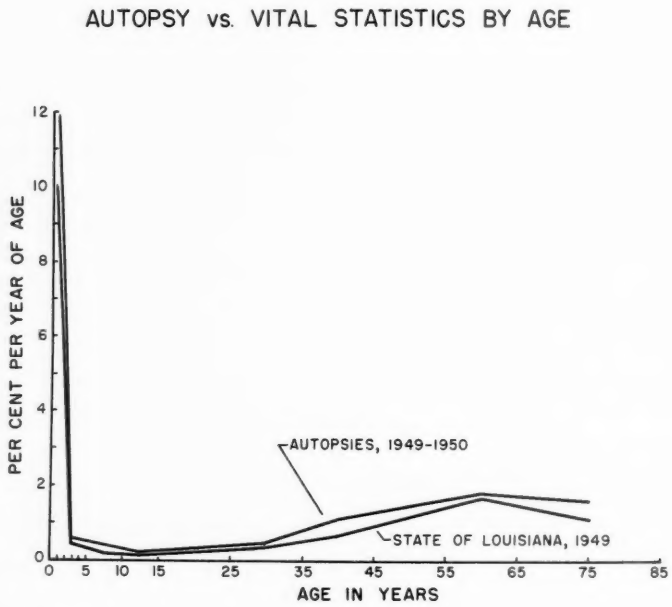
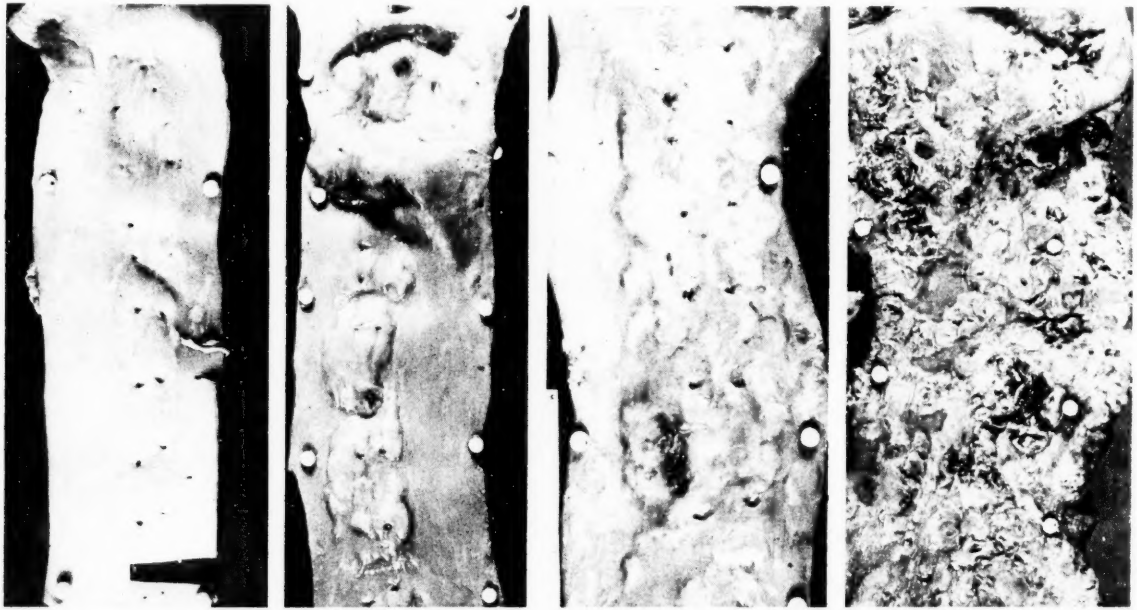


Fig. 2. Percentage and age ranges of autopsy material.

New Orleans. Of these, 103 were stillbirths and 51 were neonatal deaths, all of which were excluded from this series. From the remaining 404 necropsies, the entire aorta was obtained in 300 cases. There was no conscious bias in the selection of the 300 specimens from the 404 cases, except that we may have been less likely to obtain aortas which contained clinically significant lesions, such as syphilitic or atherosclerotic aneurysms (figure 2).

The aortas were fixed in 10 per cent formalin as soon as possible following necropsy, usually within a few hours but always within 24 hours. They were pinned flat on boards to facilitate examination and were preserved for study in Kaiserling's solution and classified roughly in accordance with the scheme presented in figure 3.



Grade 1+ Grade 2+ Grade 3+ Grade 4+

Fig. 3. Aorta — thoracic portion. Grade 1+ showing fatty streaks; 2+, fibrous plaques; 3+, atherosclerosis with complications — fatty streaks, fibrous plaques and hemorrhage; 4+, advanced atherosclerosis — fatty streaks, fibrous plaques, hemorrhage, ulceration and mural thrombi.

Results

Figure 4 is a graphic representation of the 300 aortas according to the above described scheme of grading and by 10 year age groups

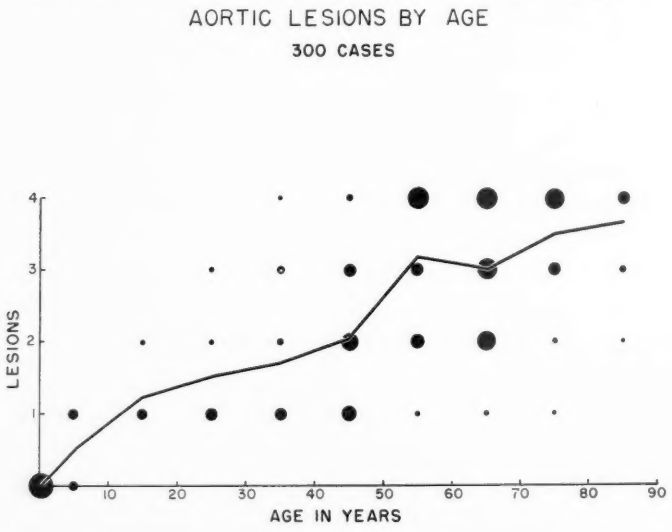


Fig. 4. Three hundred aortas graded according to scheme in figure 2 and by age groups. Area of circles is in proportion to number of aortas in each group. Solid line represents mean value for each age group, using values assigned in grading scheme.

in which the areas of the circles are proportional to the number of people found in each group. The solid line is drawn through the mean value calculated for each age group by averaging the values assigned to the various aortas.

As might be anticipated from other similar studies, the regression line for the mean value of lesions rises with age, although somewhat irregularly. The rate of rise is rather rapid up to 20 years; it levels off somewhat between 20 and 45 years of age; and then proceeds upward quite steeply between 45 and 55 years. Not clearly indicated by the graph because of the grouping by decades is the fact that every case beyond the age of 7 years had at least 1 plus lesions. Furthermore, the youngest single case in

which atheroma was found was a 1½ year old Negro male. This graph also illustrates some of the remarkable extremes in atherosclerotic involvement of the aorta within the same age group. One example is the fact that in the 30-39 year group there was one case (a 36 year old Negro female) with 4 plus lesions; while 60 per cent of the remaining cases showed only atheroma. On the other hand, in the 70-79 year group, there was one case (a 78 year old Negro female) with *only* atheroma or 1 plus lesions, while all of the remaining cases in this age group showed pearly plaques or more advanced lesions.

A graph showing the same data in somewhat different form is shown in figure 5. Again the age is by decades on the horizontal axis; but on the vertical axis is plotted cumulatively the percentage of cases in each age group with the various types of lesions. The upper line shows the percentage of cases in each group with 1 plus

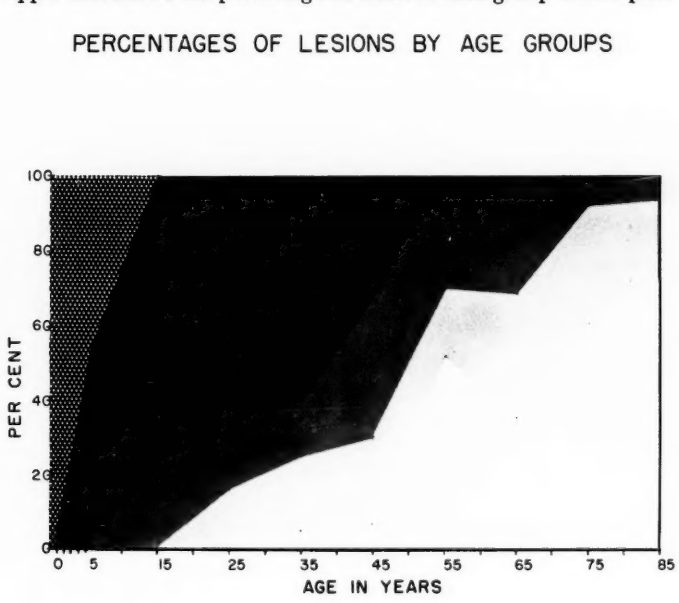


Fig. 5. Graphic analysis of data by age groups and percentage of cases in each with various types of lesions.

or greater lesions; the next lower broken line shows the percentages with 2 plus or greater lesions. The spaces between the lines indicate the proportion of cases with each type of lesion.

There is again demonstrated in this graph the rapid rise in the percentage of cases with lesions, so that after age 7 (in the latter part of the 1 to 9 year group) every case has 1 plus lesions. The same rapid rise between ages 45 and 55 is again seen, and the peak is clearly due to the appearance of large numbers of cases with 3 plus and 4 plus lesions.

One of the most striking features of this series is also demonstrated by figure 5 and that is, the very large proportion of cases, particularly between 5 and 45 years of age, which had only simple atheroma or 1 plus lesions. The appearance of pearly plaques (2 plus) and later complications (3 plus and 4 plus) lags far behind the appearance of atheroma, becoming parallel only after 25 to 30 years.

Additional analyses of the data were made to compare race, sex,

AVERAGE LESIONS FOR AGES 20 TO 90
CLASSIFIED BY RACE AND SEX

	WHITE RACE	COLORED RACE	SEX AVERAGE
MALE	2.75	2.65	2.70
FEMALE	2.47	2.58	2.52
RACE AVERAGE	2.61	2.62	

Table 1. Average number of lesions by race and sex.

state of nutrition, and principal cause of death with respect to the mean value for atherosclerotic lesions. There was not a sufficient number of cases to break down each group by race, age, and sex; and furthermore, because of the relatively small number of cases between 1 and 29 years of age, only cases between 30 and 79 years were included in the following comparisons.

AVERAGE LESION FOR AGES 20 TO 80 CLASSIFIED BY WEIGHT GROUPS

WEIGHT GROUP	AVERAGE LESIONS
Ten pounds or more underweight	2.50
Normal ± 10 pounds	2.57
Ten pounds or more overweight	2.51

Table 2. Average number of lesions by weight groups.

The principal cause of death was classified into one of five broad categories as indicated in table 3. Because it is often difficult to attribute death to a single fundamental disease in cases of hypertension, renal disease, or the various manifestations of atherosclerosis, these were grouped together in the first category. As might be expected, these cases showed a significantly higher average degree of lesions, since persons dying of the manifestations of atherosclerosis would be expected to have more severe atherosclerosis. Furthermore, it is generally believed that hypertension and renal disease in some manner aggravate the lesions of atherosclerosis. This finding also contributes indirect evidence for one

AVERAGE LESIONS FOR AGES 30 TO 80 CLASSIFIED BY CAUSE OF DEATH

CAUSE OF DEATH	AVERAGE LESIONS
AHCVRD	3.18
Cancer	2.32
Infection	2.60
Metabolic	2.50
Miscellaneous	2.48

Table 3. Average number of lesions by cause of death.

of our basic premises, namely that the aorta reflects the degree of change in other parts of the vascular system. In other words the greater the change in the aorta, the greater the probability of change in the coronary arteries. Another remarkable feature of this table is the absence of any significant difference in the average values of the lesions for the other categories of diseases.

There has been much discussion of the relationship between the terminal illness and the "fatty streaks" seen in the aortas of young people, particularly by the pathologists in the period from 1910 to 1930. The subject was quite thoroughly reviewed by Zeek[1] in 1930, and it appeared that no certain conclusions could be drawn at that time. Some observers thought that atheroma was independent of acute infections causing death in childhood (Zinserling)[2]; others thought that such lesions were precipitated by particular infections, such as typhoid fever (Klotz)[3]. There has been some doubt that such minimal fatty deposits actually represented the initial lesions of atherosclerosis, and little has

been written about them in recent decades, especially concerning their incidence in children.

In the series reported here, the number of cases in the younger age groups (especially 1 to 20 years) was too small to permit analysis based on cause of death or associated diseases. We were quite surprised to find at least some degree of atheromatosis present in every case beyond 7 years of age, and it seemed unlikely that the terminal illnesses (predominantly infections) could account for such a high incidence.

At the conclusion of the study, we were left with certain provocative questions concerning these fatty deposits in childhood: What is their real incidence in the living population? Are they actually reversible? Is it still possible that they are precipitated in a matter of weeks or days by the terminal illness? What factors are responsible for their high incidence in both sexes and both races at an early age?

Also, the relationship of fatty deposits to the fibrous plaques was not clearly answered by this study. If the fibrous plaques do represent proliferative or healing reactions to the fatty deposits, it appears that they require many years for their formation. The curve of 2 plus lesions or greater, based on the qualitative presence of pearly plaques, does not parallel closely the curve showing the incidence of simple fatty deposits, and lags far behind in the rate at which it appears in the aorta. Again we are left with the provocative question, "Do these fibrous plaques always, sometimes, or never result from previous fatty deposits?"

These questions prompted our second study which has been in progress for the past four years[4]. In this approach to the problems our activities were limited to the age group from 1-40 years and our methods were refined in two important respects — all aortas were stained with Sudan IV, and estimates were made of the percentage of the surface that stained red. The methods are illustrated in figures 6-9.

Limiting our studies to the 1-40 age group, gross Sudan staining and numerical recording of the estimated percentage of surface

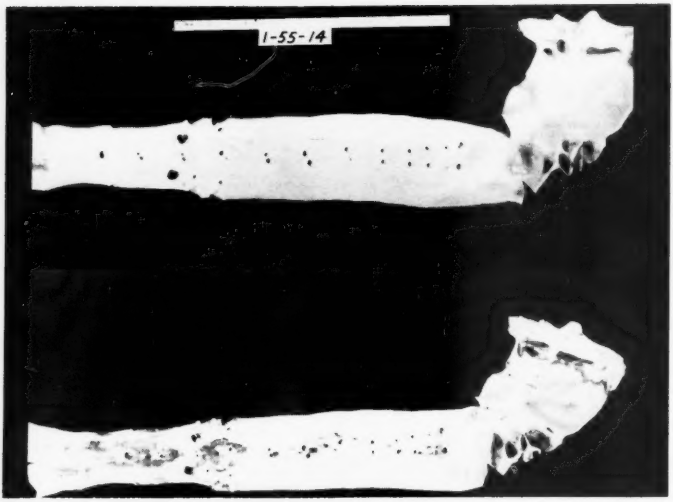


Fig. 6. Aorta before (top) and after (bottom) staining with Sudan IV. In this photograph the Sudanophilic material seen in the bottom photo stains black.

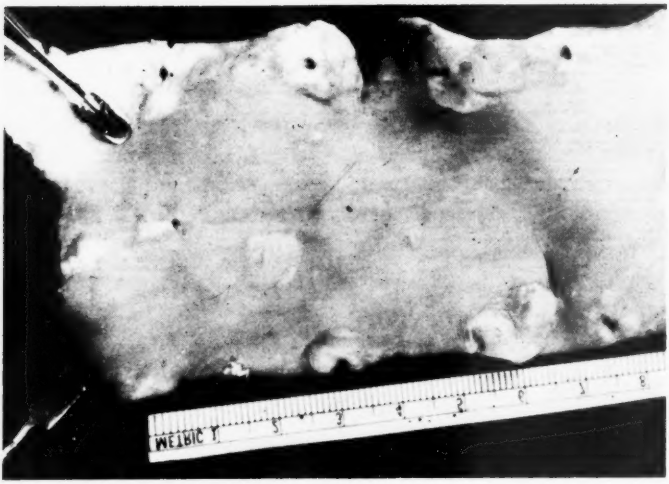


Fig. 7. Fibrous plaques surrounded by faint fatty streaks. (Unstained.)

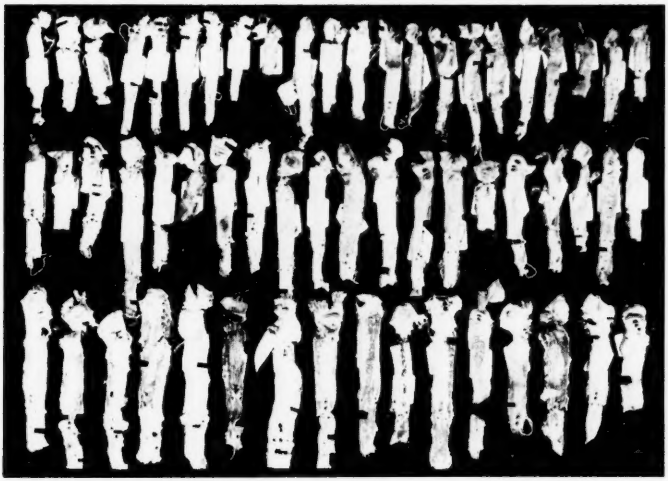


Fig. 8. Representative juvenile aortas, Ages 1-20 — New Orleans, La. Top row, 1-3 yr., av. % of surface staining red with Sudan IV — 0.3. Middle row, 4-10 yr., av. % of surface staining red with Sudan IV — 5.5. Bottom row, 11-20 yr., av. % of surface staining red with Sudan IV — 24.0. In this photo, Sudanophilic material stains dark gray to black.

Fig. 9. Representative juvenile aortas, Ages 1-20 — Spain. Top row, 1-10 yr., av. % of surface staining red with Sudan IV — 4.0. Bottom row, 11-20 yr., av. % of surface staining red with Sudan IV — 19.0.

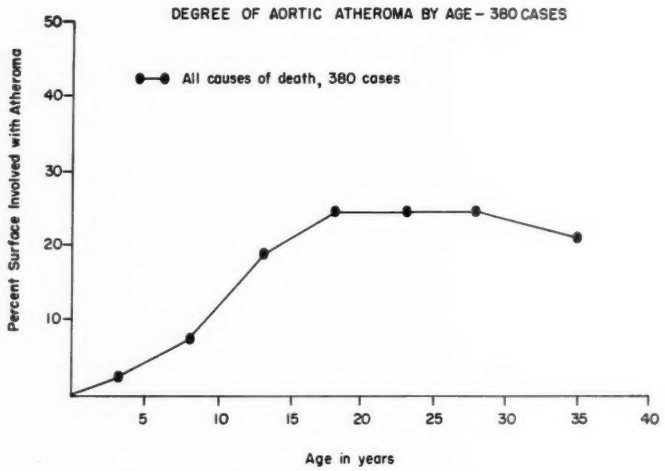


Fig. 10. New Orleans Area.

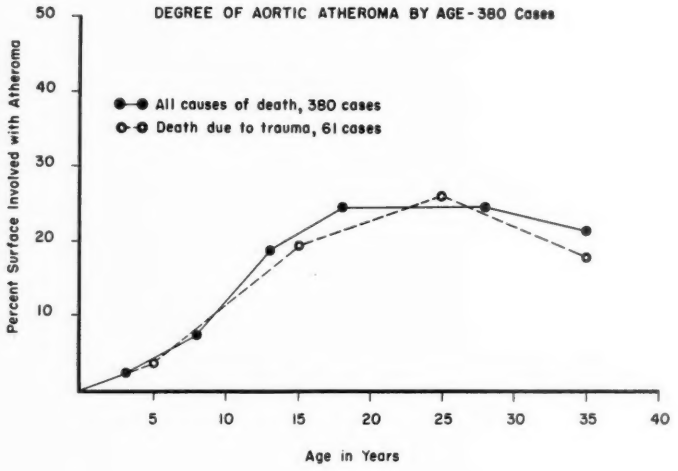


Fig. 11. New Orleans Area.

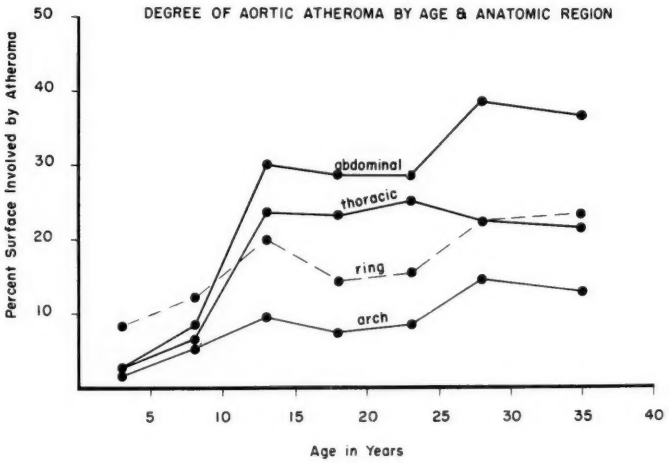


Fig. 12. New Orleans Area — 380 Cases.

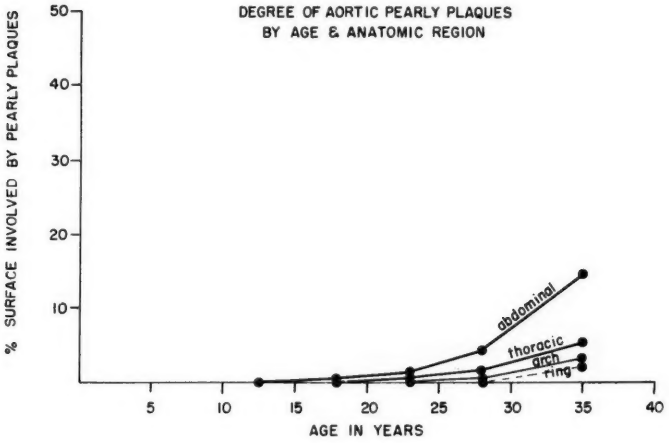


Fig. 13. New Orleans Area — 380 Cases.

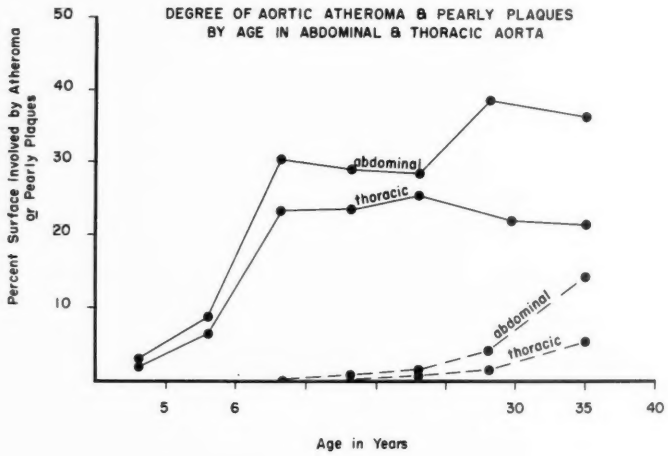


Fig. 14. New Orleans Area — 380 Cases. Atheroma — solid lines; pearly plaques — broken lines.

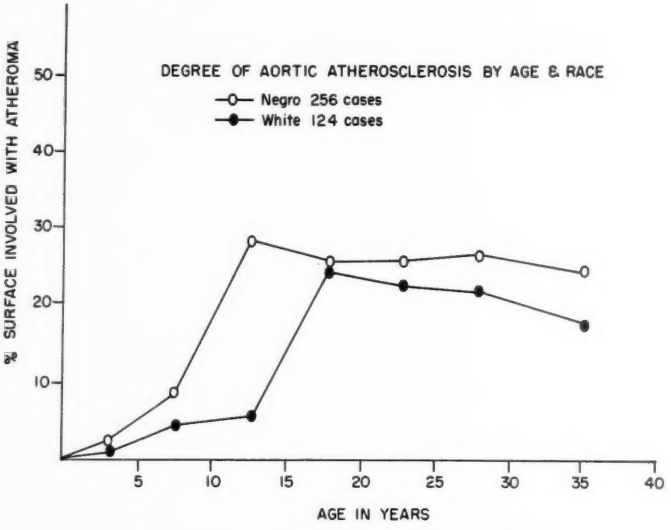


Fig. 15. New Orleans Area — 380 Cases.

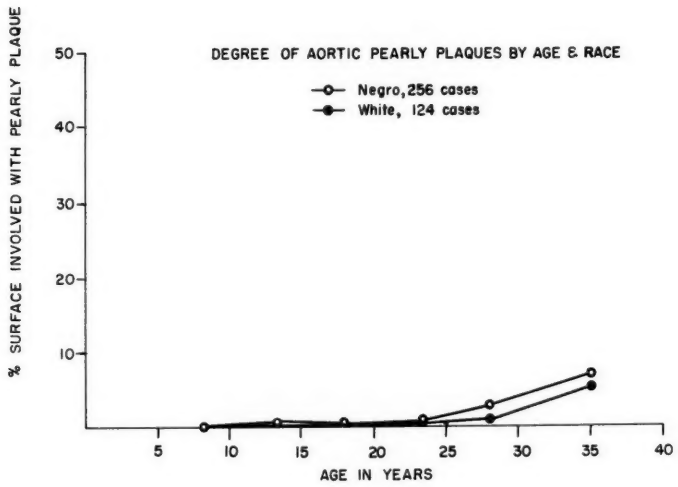


Fig. 16. New Orleans Area — 380 Cases.

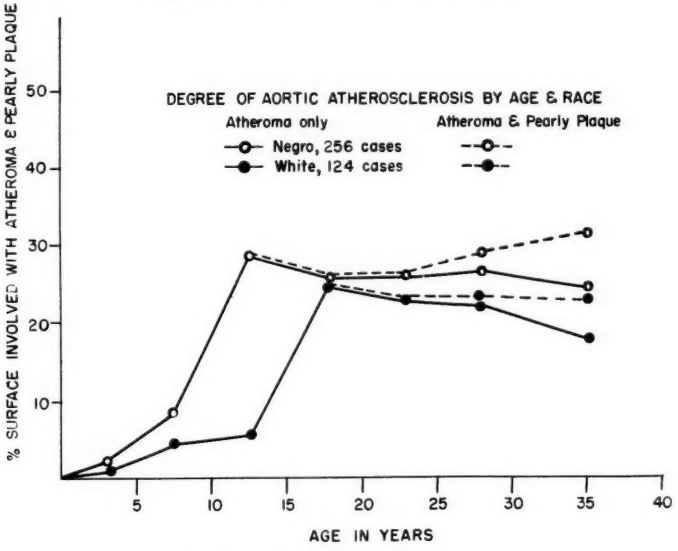


Fig. 17. New Orleans Area — 380 Cases.

staining has greatly simplified our problem and improved our confidence in the methodology. The results are graphically illustrated in figures 10-17.

The aortic lesions in cases of accidental death were compared with those in cases of death due to natural causes. These findings showed clearly that the terminal event was not responsible for the lesions observed and further that even cases of accidental death showed the same sharp rise in incidence during ages 8-18 years.

Figure 12 shows that while the earliest lesions are found in the ring, they increase rapidly in the second decade from ages 8-18 in the thoracic and abdominal portions of the aorta, and in the third decade even more in the abdominal portion.

Figures 13 and 14 on the degree of pearly plaques by age and anatomic regions show three things of interest.

1. The long lag period of approximately 20 years before pearly plaques begin to makes their appearance (figure 13).
2. All fatty streaks (or atheroma) do not become pearly plaques — only about one in five has been converted into a pearly plaque by the age of 40 (figure 14).
3. Pearly plaques occur with the same relative frequency and in the same anatomic regions as do the fatty streaks.

Special attention is directed to the first of these — namely the period of over 20 years before irreversible changes set in.

While these studies are not complete, you might be interested in some results of investigations in other geographic areas and to learn how they have affected our thinking about the basic problems of atherosclerosis (figures 9 and 18).

The base line data established in the New Orleans area (figure 8) is taken from 58 aortas obtained from the first 200 cases, selected only because they were intact. The first line, 1–3 years age, gave less than one per cent; second line, 4-10 years, 5.5 per cent; third line, 11-20 years, 24 per cent.

A comparative group of aortas from Spain (figure 9) shows first line, 1-10 years age, 4 per cent; second line, 11-20 years, 19 per cent.

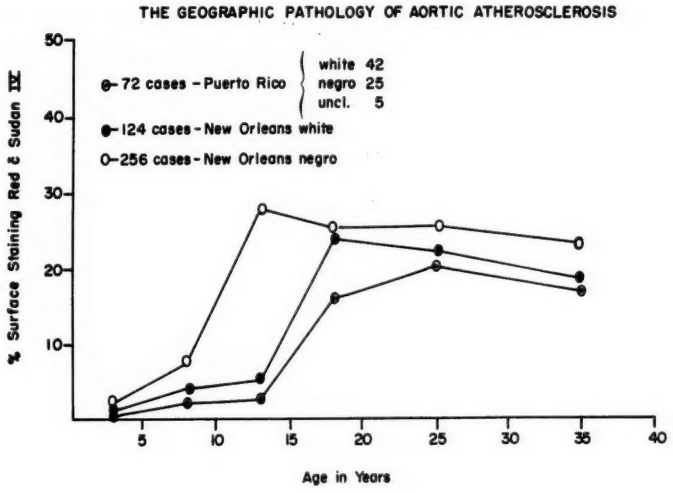


Fig. 18. Comparison between New Orleans and Puerto Rico Areas.

These and other geographic area studies were undertaken with the hope of finding a region where the population showed no aortic lesions, or an area where lesions appeared less frequently or much later. If these two objectives were not realized, it was then hoped the investigation would establish a base line of expectancy that could serve as a control of various therapeutic or preventive measures. Marked individual variations were encountered in any given population which had to be considered as a whole to arrive at a mean figure for the geographic area concerned. This individual variation in any given area exceeds the variations in mean involvement for the different areas studied to date.

The greatest difference that we have encountered to date has been in our own area involving the white and negro population at Charity Hospital between ages 11 and 15 (figure 15). At age 13 roughly five times as much of the aortic intima stains red with Sudan in the negro race as in the white race. Our biostatistician tells us that the probabilities of these findings being due to chance are less than 1 in 1,000. The change is in the same direction

for pearly plaques as seen in figure 16 — again some 20 years later.

When the two graphs are superimposed it is seen that again the Negro race leads. But the apparent decline in the percentage of surface involved is not real; actually, the total of percentage involved in atheroma *and* pearly plaques continues to rise but not as rapidly as in the second decade.

These studies are still in progress, and in some of the areas the number of aortas is insufficient for statistical significance — so we have not drawn line graphs by age and geographic areas for all the areas. However, figure 18 shows a comparison between the findings in Puerto Rico and in New Orleans, white and negro.* With collaboration from Drs. Schrimshaw and Tejada[5], enough data from Guatemala City has been obtained to draw a line below that for Puerto Rico. These recent findings illustrate the dilemma in which we now find ourselves — the incidence of myocardial infarction in Guatemala is less than 10 per cent of that in New Orleans; yet, the incidence of atheroma and pearly plaques is only slightly different.

Discussion

The important questions of etiology and pathogenesis of atherosclerosis posed by these studies remain unanswered but certain generalizations may be permitted at this time.

1. We have yet to sample a geographic area in which aortic atherosclerosis is absent or notably deficient by our current methods of recording the percentage of the surface of the aorta which stains red with Sudan IV.

2. The dilemma into which these findings (taken in conjunction with what appears to be valid statistical data indicating a greatly decreased incidence of myocardial infarction in certain areas of the world already sampled — Spain and Guatemala — is placing us), can be stated as follows:

(a) Could the minimal differences noted in our two dimensional study of aortic atherosclerosis be really significant in a

*These studies have been done in collaboration with Dr. Victor M. Arean of the School of Medicine of the University of Puerto Rico.

three dimensional study of vessels of smaller caliber? In other words could a variable thickness factor (not measured in the current studies) significantly embarrass the lumen of an artery the size of the coronary artery and thus account for the increased incidence of myocardial infarcts in certain regions (United States and England)? Conversely, could the absence of this thickness factor — presumably quantitative in nature — account for the patent coronary arteries and low incidence of myocardial infarction in certain other regions (Spain and Guatemala)?

(b) If the thickness factor is negligible, what determines the complications that result in disease in some geographic areas and not in others? Is it a disturbance in the coagulation of blood or some other mechanism?

(c) Should we forget the first line of defense — prevention of atherogenesis, and concentrate on the second line of defense — prevention of complications?

(d) Before we do this, should we not remember that there is a period of roughly two decades in which the early phase of atherosclerosis (atheroma) is potentially reversible? While a few pathologists, such as Duguid[6], still adhere to the old Rokitansky hypothesis that pearly plaques can be formed by fibrin deposition in a "normal" vessel, the vast majority of pathologists today are convinced that these deposits of fibrin occur only in and about the margins of atheromatous lesions — and that the following dicta are valid: NO LIPID — NO ATHEROMA; NO ATHEROMA — NO PEARLY PLAQUE; NO PEARLY PLAQUE — NO COMPLICATION; NO COMPLICATION — NO DISEASE. Studies now in progress will in time answer the question of whether or not the increased incidence of myocardial infarcts in certain geographic areas is due to an increased incidence of complications or — more fundamentally — is due to an increased incidence of atheroma that predisposes to complications. Regardless of this answer, so long as every link in the proposed chain of pathogenesis is sound — i.e. NO LIPID — NO DISEASE — the funda-

mental approach to the problem must be the prevention or retardation of atheroma.

3. What then do these studies on the natural history of atherosclerosis tell us? Has every child beyond the age of three years eaten too many calories, too much fat, too much animal fat, too much butter, or too many eggs? Has he had some upset in cholesterol metabolism? Has he had some hormonal imbalance? It does not seem likely that every child that has attained the age of 4 years has had hyperlipemia, hypercholesterolemia and hypertension.

4. More fundamentally these studies imply that our present attempts to emphasize filtration — and this basically is what is implied in concepts of *too much in the diet, too much in the blood, too much in the arterial wall* — do not take cognizance of the more basic processes that must be involved in atherogenesis.

5. The universal presence of atheroma and the relatively rapid increase in aortic atheroma between the ages of 8 and 18 years in all parts of the world thus far examined point to a relationship of atherogenesis to the hormonal changes of puberty. This, in addition to the striking differences in the incidence of aortic atherosclerosis in the white and negro races (11 to 15 year age group) in the New Orleans area, has stimulated us to undertake some ketosteroid excretion studies on this age group in these two races.

6. Time does not permit even a partial review of the subject. The current frontiers of the problem of atherosclerosis may be summarized as follows:

1. The arterial wall is a veritable factory.

2. Atherosclerosis is basically a pediatric problem.

Summary

The usual sequence of events in human atherosclerosis —fatty streak — fibrous plaque — complication — disease — has not yet been produced in experimental animals, and the applicability of those experimental vascular lesions which have been produced to humans is not clearly established. Concern over this lack of correlation beween experimental animal and man prompted a restudy of the natural history of human atherosclerosis in the light of some of the current concepts about this process.

The aorta was selected as the most easily obtainable large area in the arterial system, and the unstained lesions in this vessel were studied quantitatively, qualitatively, and topographically in 300 consecutive autopsies on individuals of all ages in a large general charity hospital in the southern part of the United States (The Charity Hospital of Louisiana in New Orleans). This was followed by a more detailed study of the early lesions in over 900 autopsies, age 1 to 40 years, from seven different geographic areas (New Orleans, England, Spain, Puerto Rico, Costa Rica, South Africa, and Guatemala). In this latter study the aorta (together with the coronary, cerebral, and pulmonary arteries in some cases) was stained with Sudan IV and the percentage of the intimal surface that stained red by this technic was estimated and recorded.

Our studies to date have convinced us that the aorta is the first anatomic area involved by atheroma, and that it is a reasonably good reflector of the degree of this change in the entire arterial tree.

Every case beyond the age of 3 years in all parts of the world thus far examined has shown some degree of sudanophilia in the intima of the aorta. No geographic area has shown an obvious difference in the quantitative aspects of these early changes. Whether or not the slight differences observed in this two dimensional (area) study in a large vessel (aorta) will prove significant when corrected for a possible three dimensional (space occupying) effect in a smaller vessel (coronary artery) remains to be determined, but there is no ready explanation from the anatomic data at hand for the striking differences in the incidence of related clinical disease (myocardial infarction) that have been reported from the geographic areas covered by this study.

The degree of aortic atherosclerosis in cases of accidental death was similar to that in cases of death due to natural causes, hence the terminal illness was not the determining factor.

The most striking quantitative increase in aortic atherosclerosis occurred between the ages of 8 and 18 years and suggested a relationship of atherogenesis to the hormonal changes of puberty.

Some evidence for the reversibility of early fatty streaks (areas

of Sudanophilia) has been obtained but the limits of this reversibility have not been defined.

Fibrous plaques have followed the fatty streaks, both quantitatively and topographically, approximately 20 years later. Only about one out of five fatty streaks had become a pearly plaque by age 40.

Of all the population groups thus far studied the greatest difference in the degree of aortic atherosclerosis has been found to be between the white and negro races in the 11-15 year age group in the New Orleans area. At age 13 there was roughly five times as much aortic atheroma in the negro race as there was in the white race. We have not been able to find any environmental differences in the two races that could explain this.

The data viewed as a whole have not supported the current concepts of passive filtration as the major mechanism involved in atherogenesis; but rather they have indicated active metabolic processes under the control of local and systemic factors as a more probable mechanism.

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DR. SIMMONS — Thank you, Dr. Holman. Dr. Holman has very kindly consented to open his paper for discussion and I will ask that you announce your name and company from the floor.

DR. PARKS — I am sure you share with me a feeling that we have had one of the most instructive and enlightening discourses on the pathogenesis of atherosclerosis. This disease is indeed a matter of great concern to us as medical directors because of the high instance of myocardial infarction that arises from it. I do

not think I have ever had the opportunity of seeing more beautiful slides than Dr. Holman has shown us. They were beautifully prepared and they were certainly a delight to watch. There was not too much on them and one could follow everything he said with the greatest of ease. He has touched on some of the most fundamental things that confront us in this field.

Now after the discourse and after what Dr. Dieuaide told us yesterday, it seems quite unnecessary for me to even attempt to do more than ask one or two questions, because this subject is so extensive and difficult. Very obviously all of us are interested in the question of cholesterol, diet, and also the other factors believed to precipitate this disease. I am thinking also of the mechanical as well as hormonal factors, and should like to ask him simply three questions, if he would not mind answering them.

The first question is a mechanical one, and it has always been a matter of interest to me that coronary thrombosis, the most troublesome thrombosis of the lot, occurs in an artery which is a muscular artery that is no larger than many other muscular arteries around the body. Yet it seems to be the one so very prone to thrombosis on the basis of the atheromatous plaque. In fact, here one has a muscular artery lying perhaps poorly supported in the only muscular organ that works all the time. Could it be that the beat or the pressure brought to bear on that artery by the contracting myocardium may be a factor in determining the high incidence of thrombosis — higher than in the ordinary arteries? I should like to ask him, therefore, if he would comment on that mechanical factor.

Now the next two factors I had in mind concern dieting and hypercholesterolemia. Dr. Ansel Keys, who addressed the Medical Section of the American Life Convention in 1954, and others, have mentioned the racial studies that have been made on this and which show in a parallel way what Dr. Holman has shown us here in the pathological specimens. More recently the question of vegetable cholesterol as opposed to animal cholesterol has been raised. Is there any such difference? Certainly there is a difference insofar as ingested fats are concerned, and we know now that if one ingests a high fat diet in which that fat is of animal origin, one can undoubtedly have a high level of blood cholesterol.

If one then reduces the dietary fats it is possible to reduce the blood cholesterol level. If an isocaloric intake of vegetable oil in the form of corn oil is taken, not only is the level of cholesterol not raised but it is actually decreased; and it would seem, therefore, that the ingestion of a diet that is high in corn oil will lower the level of blood cholesterol. Whether or not that has anything to do with atheroma and atherosclerosis is something else again. I would like to ask Dr. Holman, therefore, if he would comment on the role that may be played by vegetable oils in a diet that might affect the development of atherosclerosis.

Then, lastly, along the same problem of dietary control, I should like to ask him if he has ever in his experience performed an autopsy on a person who died of myocardial infarction and who showed evidence of advanced atherosclerosis in the aorta, but prior to death was known to have normal blood cholesterol and a normal distribution of the SF 10 to 20 fraction that Dartmouth has described in his publications.

I enjoyed Dr. Holman's address very much, and I am sure I share all of your views in congratulating him on what he has done.

DR. SIMMONS — Thank you, Dr. Parks. Does anyone else wish to discuss this paper?

DR. HOLMAN — Dr. Parks has raised some very fundamental questions here, and I am not going to try to answer all of them by any manner of means.

His first question is about the coronary thrombosis and the mechanical activities of the beating heart. I think we have some evidence that mechanical factors do play a role in the localization of the lesions. Investigators have shown that the lesions tend to occur in mouths or branches of vessels where currents are set up. It would be a mistake to dismiss mechanical factors. Please do not misinterpret or misunderstand me as I do not mean to say that hypertension or hypercholesterolemia play no role in it.

But, to come back to the question of the beating heart and the relationship upon coronary atherosclerosis, we do have one item of evidence on this point. Sometimes the anterior descending branch

of the left coronary artery is divided into two vessels, one of which courses in the superepicardial fat and the other in the myocardium. In those cases we find that the branch coursing through the myocardium has less atherosclerosis than does the branch that courses through the subepicardial fat. In other words, if there is any effect from the contracting myocardium, the actual physical contraction of the heart tends to massage out the lipid rather than let it accumulate.

The basic difference between the muscular artery in the heart and elsewhere in the body lies in the fact that it has less collateral circulation and that is the principal reason the heart suffers, whereas other organs are able to compensate for impaired arterial supply.

Now to come to some of the more difficult problems, one of which is the question of diet and hypercholesterolemia. I am not an authority on this subject. I know part of the literature and I am not fully convinced in my own mind that there is a striking difference between vegetable cholesterol and animal cholesterol. It is still cholesterol. As to just what the extent of dietary management with vegetable and animal fats can do to the blood cholesterol, I think in general the corn oil with its greater quantity of unsaturated fatty acids does tend to lower to some extent the blood cholesterol level. There are a number of cases, however, in which the blood cholesterol level has been dissociated strictly from atherogenesis. I refer to the experimental work in rabbits in which diabetes led to a marked increase in the blood cholesterol level without inducing atherosclerosis; and furthermore when cholesterol was added to the diet of normal and diabetic rabbits, a marked hypercholesterolemia — extreme hypercholesterolemia — was induced, but the degree of atherosclerosis was not aggravated by the superimposed hypercholesterolemia. The same is true of detergents that have been injected intravenously.

I did not mean to imply that change of the dietary fat cannot also influence the blood cholesterol level and conceivably the relationship to atherogenesis. These studies from all parts of the world, however, suggest to me that the general factors basically responsible for atheroma must be something a little broader than just the blood cholesterol level.

Now as to your third question of whether I have ever seen a myocardial infarction in a case with known normal blood lipids, that is, the absence of hypercholesterolemia — absence of Goffman factors — the answer is, I have not seen such a case. In the current issue of CIRCULATION, supplementary volume, they have reviewed some of these compensating lacks and refer to a number of cases in which none of these factors was elevated above the so-called normal level. I think quantitatively there does not seem to be a definite relationship. The majority report in the article concluded that cholesterol measurements were equally valid with the more physical factors.

DR. SIMMONS — Thank you, Dr. Holman. We feel indebted to our next speaker for having accepted the assignment of a task which I am sure has involved very much time and research. He, however, did undertake the project and has pursued it with diligence. Most of us have experienced difficulty in trying to evaluate for rating purposes the different types of cancer — where we know from clinical experience there is a difference in mortality.

I take pleasure, therefore, in introducing to you Dr. Eugene V. Higgins, Medical Director of the North American Reassurance Company of New York City, who will speak to you on the subject of "Cancer — The Challenger." Dr. Higgins.

CANCER — THE CHALLENGER

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The title of this paper has several applications to the day by day problems of medical underwriting. First, there is cancer in the sense of runner-up, next in succession, the competitor fighting for a chance to displace the champion. In fact, in one mortality grouping it has taken over first place and has become the leading cause of death for women between the ages of 30 and 60. In 1900 cancer ranked eighth among the ten leading causes of death and today it is aggressively placed second in the ranking, being led only by diseases of the heart. This advance up the scale is due, of course, to the successful control research and clinical medicine have achieved over the infectious diseases — pneumonia, influenza, tuberculosis and enteritis — which headed the list only fifty years ago. Another factor of great influence, based on the observation that cancer is particularly an upper age group disease, is our growing population with its ever increasing percentage of individuals in the older ages. In this regard it would be well to keep in mind that while the older individuals are the primary victims of cancer a very significant number of cancer deaths, over 15 per cent of the annual total, are reported in young people under twenty-five years of age. In fact, cancer kills more children in the three to fifteen year age group than any other disease.

With the constantly reported progress in the field of cardiovascular disease therapy, from the still almost unbelievable open heart surgery to the fundamental studies on arteriosclerosis and atherosclerosis, we are probably justified in concluding that the neoplastic diseases will continue to contribute an increasing percentage of deaths for some years to come. However, on that score no one can look very far ahead. There are ideas, concepts and theories being advanced and investigated today which could prove

explosively successful and make all projection of past experience curves completely valueless.

Then, cancer challenges in the sense of the insidious, pervasive, disruptive and destroying blight which we in medicine see most vividly. It challenges the normal structures and function of any of our body tissues from blood stream to brain, from most solid bone to most delicate gland, it can lay low the infant and it can make a torment of old age's final days. It is no wonder that such a multifaceted horror has been regarded as insoluble as the mystery of life itself not only by the uneducated but even by serious students in the past.

This challenge of cancer which defies us to define its genesis and reveal its cure is one of the most stimulating spurs which nature has applied to man. Fortunately, the spur bloodies each and every one of us and there is hardly anyone so ignorant or indifferent but what he will contribute something, be it brain, brawn or bottom dollar, to blunt its raking slash.

Our response to the challenge is evident in the extensive activities of the American Cancer Society under the medical direction of Dr. Charles S. Cameron and the work being done at the National Cancer Institute guided by Dr. John R. Heller. It is not the best method of showing this activity but it is significant to note that in 1938 the Institute worked on a budget of $400,000 while this year it has an appropriation of $48,000,000, with one-third of this being used by the research program of the Institute itself and the remainder being distributed as grants to private institutions and individuals all over the United States. The American Cancer Society received contributions of $4,000,000 in 1945 for its work; last year, 1955, its contributions came to $24,000,000. Approximately 60 per cent of this amount is devoted to their cancer research and education program, 25 per cent to cancer patient services.

It is not possible in this paper to list the privately endowed medical research centers and clinics at grips with the cancer problem and to name a few would not be fair to the many omitted. A recent addition to the attacking forces in action against cancer has been the United States Atomic Energy Commission. Its reports deal with the use of radioactive materials in therapy, their

dangerous aspects as causative agents and their value to research in biochemical cell structure and function.

The insurance industry has contributed both men and money to these activities but it has been on an individual basis not to be compared with the well organized, united effort made in setting up the Life Insurance Medical Research Fund. This Association should take a positive position on the need for and the value of a more definite contribution by the industry to the work being done toward the solution of the cancer problem.

Finally, cancer challenges those in the field of Insurance Medicine in the sense of being a most serious mortality evaluation problem. As physicians we understand fully, from having seen many times, the shock and disruption of living patterns which a cancer diagnosis can produce. As Medical Directors we are well aware that one of the ways an individual attempts to remedy this disruption and restore some stability to his planning is by applying for life insurance protection for those dependent on him. We have the responsibility for issuing or declining this protection to these medically impaired men and women. The way we meet that responsibility, the accuracy of our evaluation of the mortality problem presented in the history, the examination, the attending physicians' reports and the laboratory data before us will be our answer to "Cancer — the Challenger" as it presents itself daily to us.

The obligation we have today is the same old one our honored predecessors in the work of Insurance Medicine accepted. It is a twofold obligation which requires us in conscience to make judgments which will protect that statistical entity known as company mortality and which will make insurance protection available to as many individuals as possible who apply for it. The individuals who present the underwriting mazes such as cancer are seldom "sold" insurance because the agents in the field, know only too well the hazards and heartbreaks associated with such an application to compete very strongly for it. These people come and ask the company to set a price so that they may buy. Nowhere more than in this particular problem of cancer underwriting is anyone better fitted than the Medical Director to do the thinking and accept the responsibility for setting the

price on the insurance issued. It is his problem from preliminary inquiry through the whole case to final notation of rated issue or declination. And this is exactly as it should be.

Obviously, declination is the safest answer in protecting company mortality but it certainly does not contribute to company growth or service nor does it satisfy the other obligation to make insurance available when sought. To quote from a Rating Manual of 1915, "The history or existence of a cancer of any variety in the applicant is cause for absolute rejection". In forty years we have progressed considerably from that iron curtain position.

Rarely is a case rejected without some feeling of dissatisfaction about it. The only constant exception to this reaction is the lack of candor problem. So, in the case of the applicant presenting a history of cancer the Medical Director will be able to determine conditions on which companies can make an offer of a kind that shall satisfy the double obligation to insurer and to insured.

Let us now consider the basis for the offer of life insurance to the applicant with a cancer history. Conferences with my associates and others, as well as correspondence with Dr. Charles Cameron of the American Cancer Society, Dr. John Heller of the National Health Institute and Dr. Matthew H. Griswold, Chief of the Division of Cancer, Connecticut State Department of Health, leaves me with the opinion that review and revision of current cancer underwriting rules and classifications are needed to provide more selective, individually evaluated insurance protection for these applicants. "Selective" is used here in the sense of identifying those cancer risks which are explosively unpredictable as well as those which give good grounds for more favorable underwriting action than any accepted as risks in the past.

The next part of this report will be an outline of the facts on which this opinion is based. The facts to be outlined prompted a revision of the Cancer Section of the North American Reassurance Company's Rating Manual. The action this Company has taken in the field of cancer underwriting over the past thirty years is interesting and is outlined in tables I (a, b, and c).

This course of action, directed in past years by Dr. James T. Montgomery and Dr. Edgar W. Beckwith, follows the numerical

guidance of Impairment Studies and also reflects appreciation of the fact that when a significant amount of work is obviously being done and immense amounts of money are being spent to solve the cancer problem vital knowledge will be uncovered concerning its nature even if the problem itself is not completely solved and shelved.

TABLE I (a)

CHANGES IN CANCER UNDERWRITING

North American Reassurance Company, 1925 to 1955

Extra premiums in dollars per thousand to be charged the specified number of times according to the number of years after operation.

	Carcinoma and Sarcoma				
	1925	1936	1946	1952	1955
Within 1 year	Decline	Decline	Decline	Decline	Decline
Within 2 years	Decline	Decline	Decline	Decline	Decline
Within 3 years	Decline	Decline	Decline	Decline	Decline
Within 4 years	30.00 5x	Decline	Decline	Decline	15.00 6x*
Within 5 years	30.00 4x	Decline	30.00 6x	20.00 6x	15.00 5x
Within 6 years	30.00 3x	30.00 5x	30.00 5x	20.00 5x	15.00 4x
Within 7 years	30.00 2x	30.00 4x	30.00 4x	20.00 4x	15.00 3x
Within 8 years	17.50 2x	30.00 3x	30.00 3x	20.00 3x	15.00 2x
Within 9 years	15.00 1x	30.00 2x	30.00 2x	20.00 2x	15.00 1x
Within 10 years	5.00 1x	30.00 1x	30.00 1x	20.00 1x	+30 to 0
Within 11 years	0	+25	+30 to 0	+30 to 0	0

*Plus one extra premium of $15.00.

TABLE I (b)

CHANGES IN CANCER UNDERWRITING

North American Reassurance Company, 1925 to 1955

Extra premiums in dollars per thousand to be charged the specified number of times according to the number of years after operation.

	Epithelioma, Squamous Cell (Epidermoid) Carcinoma				
	1925	1936	1946	1952	1955
Within 1 year	Decline	Decline	Decline	Decline	7.50 4x
Within 2 years	Decline	Decline	Decline	7.50 4x	7.50 3x
Within 3 years	Decline	Decline	Decline	7.50 3x	7.50 2x
Within 4 years	20.00 5x	12.50 5x	10.00 6x	7.50 2x	7.50 1x
Within 5 years	20.00 4x	12.50 4x	10.00 5x	7.50 1x	0
Within 6 years	20.00 3x	12.50 3x	10.00 4x	0	0
Within 7 years	20.00 2x	12.50 2x	10.00 3x	0	0
Within 8 years	12.50 2x	12.50 1x	10.00 2x	0	0
Within 9 years	10.00 1x	+20	10.00 1x	0	0
Within 10 years	5.00 1x	+20	+20	0	0

TABLE I (c)

CHANGES IN CANCER UNDERWRITING

North American Reassurance Company, 1925 to 1955

Extra premiums in dollars per thousand to be charged the specified number of times according to the number of years after operation.

	Epithelioma, Basal Cell Carcinoma				
	1925	1936	1946	1952	1955
Within 1 year	Decline	Decline	Decline	Decline	0*
Within 2 years	Decline	10.00 4x	7.50 3x	5.00 3x	0
Within 3 years	Decline	10.00 3x	7.50 2x	5.00 2x	0
Within 4 years	10.00 5x	10.00 2x	7.50 1x	5.00 1x	0
Within 5 years	10.00 4x	10.00 1x	0	0	0
Within 6 years	10.00 3x	0	0	0	0
Within 7 years	10.00 2x	0	0	0	0
Within 8 years	5.00 2x	0	0	0	0
Within 9 years	5.00 1x	0	0	0	0
Within 10 years	5.00 1x	0	0	0	0

*With histologic diagnosis.

It is this significant knowledge and the methods devised to obtain it which make up the facts mentioned above. These facts may be analyzed as follows:

(1) study of the genesis of cancer
(2) current methods for the diagnosis of cancer
(3) progress in the treatment of cancer
(4) statistical evaluation of the epidemiology of cancer including the Impairment Studies

The Genesis of Cancer

Dr. William Boyd of Toronto used this phrase in a still most readable paper delivered before the Medical Section of the American Life Convention in 1941. By it, he indicated a consideration of the causes and beginnings of cancer. Because of the unrestrained growth pattern of cancer cells the problem has long been approached from the biological viewpoint in which efforts are made to determine the factor that stimulates the abnormal growth or what factor is absent that restrains abnormal growth. Today, there is a rather wide swing of opinion toward the theory that a virus-like agent is causative of all cancer. This virus-like agent is regarded not as an extrinsic or exogenous stimulus but is conceived as a self-reproducing cell entity, latently present in the

body cells and stimulated into reproduction by the many well known carcinogenic agents. Dr. C. P. Rhoads has reported studies which confirm the likeness of cancer to disease known to be caused by parasitic micro-organisms.

Cancer has only recently been demonstrated to conform to the famous Koch postulates. The invading cancer cells are easily shown in the tissue affected. Cancer cells can be cultivated outside the body — this has been accomplished with human cancer cells within only recent months. The disease can be induced by the cultivated organisms — again, demonstrated in human volunteers only a few months ago. The last postulate, the acquiring of resistance to medications, has also been shown to occur in cancer cells. As Dr. Rhoads says, these studies "have proved certain fundamental biological principles which establish as correct the analogy employed (i. e. between cancer and parasitic micro-organisms) which has given us feeble means for better control of cancer in man today and which promise much more for the future."

This theory of a latent virus in our body cells was also propounded by Dr. Wendell M. Stanley, a Nobel prize winner and Professor at the University of California, before the National Cancer Conference last summer. He cited the herpes simplex virus as an example of this cell virus symbiotic relationship. Cancer results when the virus undergoes activation or mutation under the stimulus of a carcinogenic agent. Obviously, with such basic concepts of causation being investigated the direction of therapy can be much more successfully guided.

In a recent statement Dr. Lowell T. Coggeshall, Special Assistant for Health and Medical Affairs to Marion B. Folsom, Secretary of Health, Education and Welfare and Dean and Professor of Medicine at the University of Chicago as well as an active cancer research investigator himself, said: "Many of the best scientific minds of our country, indeed the world, are now attacking the problem with determination. From their efforts frequent advances are being made on virtually every front which lead us to believe that control of cancer is a possibility not too remote from accomplishment."

The Diagnosis of Cancer

The essential dictum in this phase of cancer work is the catch-phrase, "Early Cancer is Curable". It covers a multitude of possibilities and was the subject of a short essay in a recent issue of "Cancer Research". In ordinary usage we usually accept the phrase as meaning having only recently produced signs and symptoms. Among these, however, there are going to be some incurable cancers because of factors involving inaccessibility of site or essential nature of the structure involved or a minimal premetastatic stage. However, statistics demonstrate that the earlier cancer is found and treatment instituted, the better the survival rate. Statistics also demonstrate that in a well operated Cancer Detection Center, such as that at the University of Minnesota, the number of cancers found will be almost equally divided between symptomatic and asymptomatic.

No adequate general diagnostic test for cancer has been found as yet despite considerable study and trial. Mass cancer screening projects are being studied and in some areas, such as Memphis, Tennessee, have been under way long enough for some evaluation of their results to be assessed. The vaginal smear or cytologic test for cancer of the cervix and corpus uteri developed by Dr. Papanicolaou has been applied to over 100,000 women in the Memphis area with a report of 750 cancers found, 450 asymptomatic and not even suspected. The bottleneck in such studies was the lack of technicians trained to recognize the abnormal cells. An effort is being made to relieve this by use of an automatic electronic scanner which recognizes the unusual fluorescence shown by the cancer cells under ultraviolet light. A urine analysis indicating the degree of stomach acidity will be a fairly simple screening procedure for identifying persons with hypochlorhydria and additional x-ray examination of these individuals will then be done. With these newly devised approaches and the older methods of examination, reenforced by a continuation of the existing program of the American Cancer Society and National Cancer Institute for education of the public and the medical profession in alertness to any and all indications of cancer, an increase in the number of cancers detected in all sites should easily be achieved.

The Treatment of Cancer

Extirpative surgery and radiation continue to be the two most successful means of treating cancer. It is generally accepted that radical surgery is near a peak of technical perfection and one should expect little progress in the direction of being able to do operative procedures in the future which are not undertaken today. The training in surgery which young men entering that field have received over the past ten or fifteen years will result almost certainly in a lessening of the difference in results of cancer surgery reported by the specialty hospitals and those of the local community hospitals. Research has produced much more detailed knowledge in recent years about the choice between surgery and radiation therapy or the proper combination of the two. New types of radiation therapy have been developed and still others are on the horizon. These modalities are also being used to create new concepts of tissue and cell activities and the isotopes indicate differences between normal and cancer cell activity which will furnish new methods of attack on cancer. The technical advances in the field of radiation treatment are as amazing as those achieved by the surgeons and they are far from complete.

The great increase in chemotherapy research has produced some startling results. A few words about the work reported by Dr. C. P. Rhoads concerning nucleic acid anabolism will give some idea of what is going on in the laboratories. Fundamental biochemical studies showed that nucleic acid, a constituent of both normal and cancer cells, underwent different anabolic processes in the two. Cancer cells were more basophilic and contained more nucleic acid. Nitrogen mustard, the first of the effective chemical agents against cancer, was known to be capable of destroying nucleic acid in very weak dilutions. Radiation therapy was demonstrated to depolymerize nucleic acid. Cancer cells have been shown to have chromosome abnormalities and nucleic acid is an essential part of the chromosome. It is known that penicillin acts to prevent the reproduction of bacterial cells by changing nucleic acid function.

The patient and gifted laboratory men who recognized and assembled all these odds and ends of biochemical, bacteriological and radiation research are convinced they have opened a rational approach to the chemotherapy of cancer. To quote Dr. Rhoads:

"At one time, and not so long ago, to dream of a pill for cancer was regarded as a sign of insanity. Now we have several pills. True, their effect is feeble, certain that it is transient, and obvious that only certain forms of cancer patients respond but responses do occur. It is equally true, however, that several types of transplantable cancer in animals now can be wholly destroyed by systemic chemotherapy and cure effected. We hold that it is right to continue our work, to extend the basic principles already developed, in the hope for further cancer control in man."

The Epidemiology of Cancer

The epidemiology of cancer, that is, the statistical delineation of the cancer problem in the United States has been worked on intensively over the past twenty and particularly the past ten years. Dr. John Heller has said: "When the National Cancer Institute was established in 1937 no information was available on the distribution of cancer morbidity in the population of the United States." Clinic and hospital reports were multitudinous and very helpful but could not be related to a population base. A ten city study area was mapped out and with the help of State and County Medical Societies thousands of physicians contributed information to the Institute in 1937 and again in 1947. These cancer surveys have supplied us with knowledge of inestimable value.

In this field of cancer epidemiology three extensive reports have been released during the past year. The first was "Some Observations on the Epidemiology of Cancer in the United States" from the office of Dr. John Heller of the National Cancer Institute, published in the December 25, 1955 issue of the Journal of the American Medical Association. The next was "Survivorship of Reported Cancer Cases in Northern New York State" from the office of Dr. Paul R. Gerhardt, Director of the Bureau of Cancer Control, N. Y. State Department of Health, which appeared in the July, 1956 issue of the American Journal of Public Health. The third, and a most impressive piece of work, was "Cancer in Connecticut, 1935-1951" and a brief analysis of this work, "Improvements in Cancer Survival Rates," in the New England Journal of Medicine of June 7, 1956. Both were from the office of Dr. Matthew H. Griswold, Chief of the Division of Cancer, Connecticut State Department of Health.

Three additional publications from which data were taken for this report were: the 1956 report on "Cancer in Iowa" from the office of Dr. Edmund G. Zimmerer, Commissioner of the Iowa State Department of Health; the "Epidemiological and Vital Statistics Report" published in July, 1956, by the World Health Organization; and "Cancer at Mid-Century" presented by Dr. Michael Shimkin of the National Cancer Institute at the June, 1956, National Cancer Conference.

All who heard Dr. Neil E. McKinnon at our 1954 Toronto meeting, and those who did not but have read his paper on "Cancer Mortality" will have no trouble recalling the potent use he made of clinical statistics in his conclusion, and I quote: "The past twenty-five to thirty years have provided a vast experience which has demonstrated fallacy in our conceptions of the spread of cancer, fallacy and discrepancy in diagnosis, and fallacy thereby in appraisal of the results of treatment. In spite of earlier and more extensive treatment, they have not given any decisive reduction in mortality from metastasizing cancer."

Clinical data substantiate the following points in his paper:

1. The mortality pattern of a series of cancer cases is determined by the types of cases in that series; mixing the types leads to an unreliable set of conclusions.

2. The stage and character of the tumor present is the most important factor in prognosis.

3. In different series this factor will be evaluated by different clinics and differing values assigned by individual pathologists to such matters as anaplasia, differentiation and mitosis.

4. Microscopy cannot prognosticate the metastatic tendency of a particular tumor.

5. Duration and stage of a tumor have little demonstrable relationship.

6. These facts make the submitted evidence in many series doubtful, in others fallacious and in all subject to several reasonable interpretations.

This very logical report by Dr. McKinnon led to his discouraging observation that, "The past thirty years have not given any decisive reduction in mortality from metastasizing cancer." That

refers, of course, to cancer on which it is not possible to place a reasonable mortality evaluation. Once the cancer case reaches the fourth or fifth year after treatment and later, however, one can hazard a fairly sound estimation as to the character of the cancer which was present. It is then possible to set some rational limits to the probabilities in the particular case with the assistance of laboratory reports, attending physicians' statements, medical examination and inspection reports.

In addition to that somewhat solacing thought recent reports from sources which certainly must be regarded as being statistically reliable give a somewhat more optimistic evaluation of the work being done.

Dr. Heller of the National Cancer Institute states: "Early diagnosis of cancer is generally recognized to offer the most hope for successful treatment. This principle of cancer control is supported by data collected through follow-up of patients with cancer." He presents a table based on over 80,000 observations of patients with cancer (table II) which indicates the survival experience based on the stage of cancer development at the time of diagnosis. Dr. Heller concludes: "For a number of sites of cancer origin, the data suggests that some progress has been made in the management of the cancer problem. Further substantial advances are within reach through fuller utilization of available technics."

TABLE II

Cancer Survivors, by Stage at Diagnosis (percentage)

	Period Survived			
Stage at Diagnosis	**1 yr.***	**1 yr.****	**5 yrs.****	**10 yrs.****
All stages	64	54	27	16
Localized	84	72	43	26
Regional involvement	58	50	20	11
Remote metastases	28	14	3	1

*National Cancer Institute.
**Connecticut Cancer Register.

Dr. Griswold, Chief of the Division of Cancer in the Connecticut Department of Health, in a report on more than 70,000 cancer cases observed from 1935, states: "The trend in five year survival rates indicates that the outlook for diagnosed cases is improving.

Though stage at diagnosis is a controlling factor in prognosis, the observed improvement in the five year survival rates appears to be due to more effective utilization of available therapeutic technics." He presented a table (III) which shows the basis for this opinion. He specifically considers one of the doubts raised by Dr. McKinnon and says: "Since the higher survival rates for localized and regional cases were accompanied by higher rates for all stages combined, the increase in survival rates by stage cannot be attributed to changes in the classification of cancer by stage. This leads to the conclusion that therapy rather than a shift in stage at diagnosis was primarily responsible for the improved survival experience."

TABLE III

Five year Survival Rates (percentage) by Stage at Diagnosis in Different Time Periods*

	1935-40	1941-46	1947-51
All Stages	25	29	32
Localized	39	44	51
Regional involvement	18	20	22
Remote metastases	1	2	2

*Connecticut Cancer Register.

In the National Cancer Institute Report three items are of major importance: prevalence, incidence and mortality. As indicated in table IV, incidence showed a 14 per cent increase and since this figure was reached after making an adjustment for the changed age composition of the study group between 1937 and 1947 the increase is most probably due to better diagnosis, more awareness of the significance of early lesions and more adequate laboratory studies to identify the condition if it is suspected.

The 3 per cent increase in mortality when prevalence had increased by 10 per cent and incidence by 14 per cent suggests that progress has been made in the management of the cancer problem — probably a combination of earlier case finding and more successful treatment. This thought is fairly well confirmed by the fact that in 1937 out of every 100 cancer patients seen 68 were hospitalized, while in 1947 this number increased to 73. Also, in 1937 only

TABLE IV

Basic Epidemiologic Cancer Classifications*
Prevalence — Incidence — Mortality

Prevalence:	number of persons per 100,000 of population known to have had cancer at any time during the study year:		
	1937: 390	1947: 430	10% increase
Incidence:	number of persons per 100,000 of population first diagnosed as having cancer during the study year:		
	1937: 280	1947: 319	14% increase
Mortality:	number of persons per 100,000 of population dying during the study year with cancer as the primary cause:		
	1937: 144	1947: 149	3% increase

*National Cancer Institute.

61 of every 100 had microscopic diagnosis, while in 1947 this figure went to 72.

The outstanding change between 1937 and 1947, as reported by Dr. Heller in December 1955 when final tabulations were completed, was the large increase in cancer of the lung and bronchus. Both incidence and mortality rate more than doubled. This may have been due to improved case finding in part but it appears too large not to include an appreciable real increase as well. The National Institute is continuing to collect and evaluate evidence in an effort to either prove or disprove the cause and effect relationship between smoking and lung cancer. As yet the evidence indicates multiple enviromental factors, of which smoking is one, as probable carcinogenic agents.

Let us refer again to the table (II) showing the number of survivors according to the stage of cancer when the diagnosis was made. Obviously, this table is an essential guide to any evaluation of insurability in the applicant with a cancer history. While we are looking at it, however, changes are taking place in it. This is because the statistics concerning cancer by site indicate that half of all forms of cancer (excluding skin) originate in organs accessible to direct examination by the physician in his office, i.e. cancer of the prostate, rectum, mouth and pharynx, thyroid, breast and

uterus. Yet, only half of these are being diagnosed while localized at the site of origin.

Here, certainly, is a job for education. Education of the public and of the medical profession to a realization of the deadly importance of what they may be missing through indifference, carelessness or neglect. This is another field in which Medical Directors who control the physical examination of thousands of people every year, can do much to stimulate the examining staff to an awareness of the opportunity to be of invaluable service to the applicant for insurance who undergoes their questioning and examination. The life insurance sales representative or the physician would be proud to have an existing impairment of health such as cancer recognized and brought under care through our services. Granting the diagnosis and the completion of adequate treatment the insurer can

TABLE V

Estimated Current Cancer Incidence and Mortality by Sex and by Site in Percentage of Total Cancer Incidence and Mortality.*

1. Estimated Cancer Incidence by Site in Percentage of Total Cancer Incidence.
2. Estimated Cancer Mortality by Site in Percentage of Total Cancer Mortality.

Male	1.	2.	Female	1.	2.
Skin	14	2	Breast	22	19
Lung and bronchus	11	17	Cervix uteri	11	12
Stomach	11	12	Skin	10	1
Prostate	11	11	Large intestines	9	12
Large intestines	9	9	Stomach	5	8
Buccal cavity and pharynx	7	3	Rectum	5	4
Urinary organs	7	6	Ovary	5	6
Rectum	6	5	Corpus uteri	3	2
Lymphomas	4	2	Urinary organs	3	3
Leukemia and aleukemia	3	5	Lymphomas	3	2
Pancreas	3	5	Liver and biliary	3	5
Esophagus	3	3	Lung and bronchus	2	3
Larynx	3	2	Leukemia and aleukemia	2	4
Liver and biliary	3	4	Pancreas	2	4
Brain and nervous system	2	3	Buccal cavity and pharynx	2	1
			Brain and nervous system	1	2

*C. S. Cameron, M. D.; Combination of U. S. Ten City, N. Y. and Connecticut Cancer Reports.

always approach such a man with confidence that he will appreciate the help rendered him and more than likely he will return for consideration as an applicant again.

Continuing this interesting and practical subject of cancer epidemiology and before taking up an evaluation of the 1951 Impairment Study, there are a few tables and graphs to present. Table V, is a composite of the estimates made by the National Cancer Institute, the New York State Cancer Registry and the Connecticut State Cancer Registry, showing the estimated current cancer incidence and mortality by sex and by site in percentage of total cancer incidence and mortality.

Table VI, is derived from a report published in the June 1956 "Statistical Bulletin" of the Metropolitan Life Insurance Company and shows cancer mortality by sex and by site in two different age groups. The mortality is that experienced by industrial policyholders and arranged so that the highest mortality figures are at the top of each column. The figures are in terms of an average of annual death rates per 100,000.

TABLE VI

Mortality from Cancer of Specified Sites
Whites by Sex and in Age
Groups 45-54, and 55-64* (percentage)

Males			Females		
	45-54	55-64		45-54	55-64
Respiratory system	33.3	30.7	Breast	24.9	18.6
Stomach	8.6	9.7	Uterus	16.5	14.2
Lymph. and hemato.	8.5	6.9	Intestines	10.7	12.8
Intestines	7.8	9.1	Ovary	9.5	7.4
Urinary system	5.8	5.9	Lymph. and hemato.	7.0	6.8
Pancreas	5.5	4.4	Stomach	3.9	5.8
Buccal and pharynx	4.8	4.0	Rectum	3.8	4.7
Liver	3.6	3.9	Respiratory system	3.5	4.2
Rectum	3.4	5.4	Liver	2.8	5.7
Genitalia	1.8	5.1	Pancreas	2.7	4.5
Skin	1.7	.9	Urinary system	2.0	3.0
Prostate	1.3	4.7			

*Statistical Bulletin, Metropolitan Life Insurance Company.

Table VII, is a report from the National Cancer Institute showing the change in percentage of cancer incidence and mortality from 1937 to 1947 by major systems.

TABLE VII

Change in Cancer
Incidence and Mortality (percentage)
from 1937 to 1947*

Primary Site	Incidence	Mortality
Female genitalia	0	— 10
Digestive system	0	— 8
Urinary organs	+ 16	— 8
Male genitalia	+ 16	— 2
Buccal cavity	+ 12	+ 2
Breast	+ 11	+ 9

*National Cancer Institute.

The next, Table VIII, is a Connecticut State report showing by sex and by site the percentage of cancer patients surviving for five years after diagnosis. These figures are divided so as to group them above and below an arbitrarily selected 20 per cent survival rate.

TABLE VIII

Cancer patients surviving for five years after diagnosis
(percentage)
By Sex and by Site: 1947 to 1951*

Male		Female	
All Sites	25	All Sites	38
Sites with survival rates lower than 20%		Sites with survival rates lower than 20%	
Pancreas	1	Pancreas	1
Esophagus	2	Stomach	7
Lung and bronchus	3	Esophagus	8
Stomach	5	Lung and bronchus	8
Sites with survival rates higher than 20%		Kidney	16
Brain and nervous system	20	Sites with survival rates higher than 20%	
Prostate	21	Ovary	24
Rectum	21	Brain and nervous system	25
Large intestines	24	Rectum	31
Kidney	27	Bone	32
Bladder	28	Large intestines	33
Bone	28	Bladder	36
Buccal cavity and pharynx	35	Buccal cavity and pharynx	44
Larynx	37	Breast	46
Breast	51	Cervix uteri	53
Skin	67	Corpus uteri	62
		Skin	68

*Connecticut Cancer Register.

The next, Figure 1, is a graph showing cumulative mortality in percentage of the cancer patients alive at stated time intervals

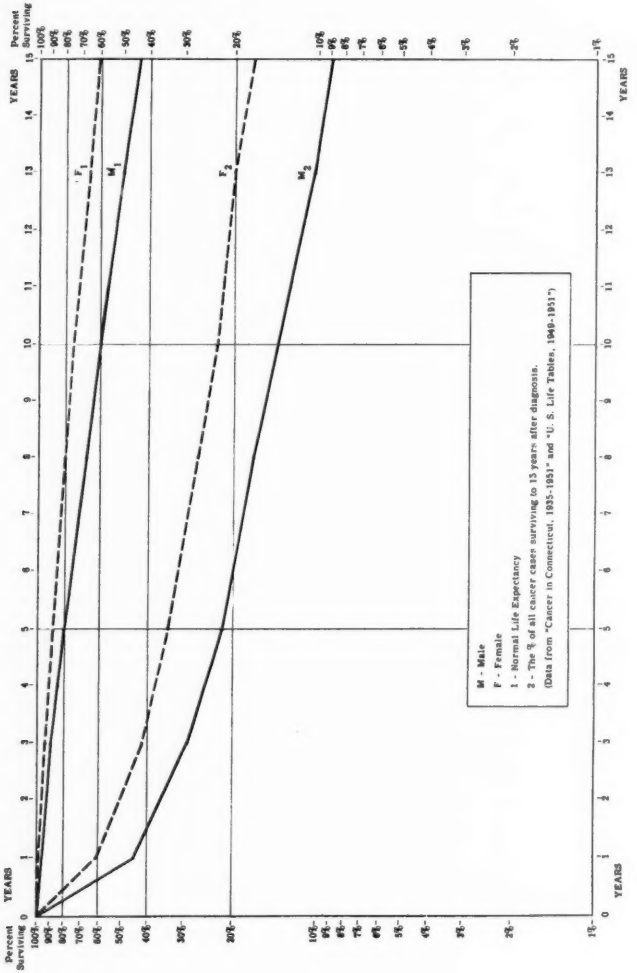
Percent Surviving
YEARS
F1
M1
F2
M2
M - Male
F - Female
1 - Normal Life Expectancy
2 - The % of all cancer cases surviving to 15 years after diagnosis.
(Data from "Cancer in Connecticut, 1935-1951" and "U. S. Life Tables, 1949-1951")

Figure 1

after diagnosis. The figures for this graph were collected by the Connecticut State Cancer Registry where more than 75,000 cancer cases acted on in all stages of progression are tabulated. This graph is on semilogarithmic double phase scale, permitting direct comparison of rate change, and it indicates a mortality rate which decreases with time.

Across the top of each graph is plotted the curve of normal life expectancy. This was derived from the "United States Life Tables and Actuarial Tables for 1949-1951" released in 1955. The curves for males and females are a weighed average of the life expectancy for five age groups: under 45, 45-54, 55-64, 65-74 and over. When compared with these graphs showing the expected mortality rate for the general population of equivalent age composition the cancer curves are seen to become nearly, but not quite, parallel with them after five years survival. It seems reasonable to conclude that the rate of depletion in the cancer group surviving five, ten, fifteen and more years is likely to remain somewhat elevated above that which will be shown by the population in general. Once again, these charts show the better mortality experienced by women.

Figure 2 shows the survivorship rates for cancer cases diagnosed when localized, after regional involvement had occurred and when distant metastases were reported. The upper curve, that of the localized cancer cases, parallels very closely the normal life expectancy graph and it is these cases we are trying to identify and underwrite properly. As in the preceding graph, the women survive longer.

The life insurance industrywide study of neoplastic disease as reported in the 1951 Impairment Study is somewhat disappointing in the fact that its extent is so limited. There were only 970 entrants for carcinoma and sarcoma combined. This relatively small number prevents any exact projection of experience but does give some basis for calculations directed toward arriving at an acceptably sound extra premium to be applied for a history of cancer.

It seems quite reasonable that the cancer section of the 1951 Impairment Study should be relatively small, i. e. 970 entrants

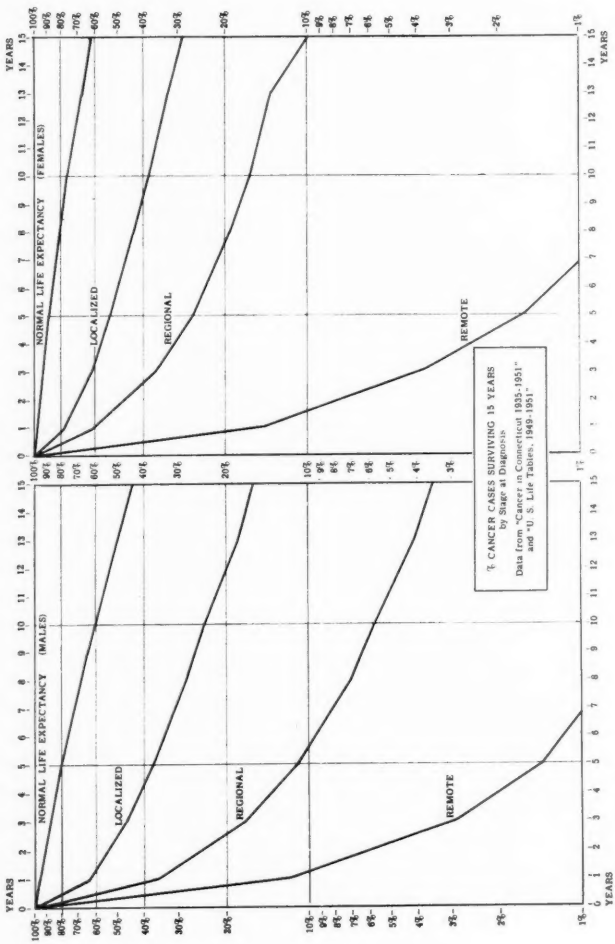
NORMAL LIFE EXPECTANCY (FEMALES)
NORMAL LIFE EXPECTANCY (MALES)
LOCALIZED
REGIONAL
REMOTE
YEARS
% CANCER CASES SURVIVING 15 YEARS
by Stage at Diagnosis
Data from "Cancer in Connecticut 1935-1951"
and "U. S. Life Tables, 1949-1951"

Figure 2

out of a total of 625,000 in the study. For one thing, the applicant with a cancer history has always been underwritten with considerable caution — and rightly so. For another, the extra premium assessed on the policy issued to this applicant has been quite high in the past — when the case was not immediately declined — and this acted as an efficient economic deterrent for many.

One of the most pertinent things learned from the 1951 Impairment Study is the confirmation of the shift in disease patterns from the formerly predominant infectious causes of death to the cardiovascular and neoplastic conditions which dominate our mortality studies today. In the cardiovascular field the insurance industry contributes most effectively through the Life Insurance Medical Research Fund to the resolution of the problems which abound in that field of medicine. Every underwriter tries to apply practically to daily underwriting problems the leads with which clinical investigation furnishes him. The simple fact that many are now struggling with the underwriting of persons with a history of coronary disease, of hypertensive patients under treatment, or applicants who have recovered from cardiac surgery indicates that progress is continuing. Similar developments have taken place in cancer diagnosis, treatment and research. The past record shows that we have been aware of such changes and have adjusted our mortality thinking in terms of progress made.

Two sections of the 1951 Impairment Study should be kept in mind when taking up consideration of this problem. The first is the G 1 — G 6 group, listing a total of 970 entrants made up of both carcinoma and sarcoma cases which had undergone one operation and on which insurance was issued from the third year post-operative, i. e. both standard and substandard issues combined. This group had 39 deaths with 32 expected, showing a mortality ratio of 148 per cent. The second is the G 3 group listing carcinoma cases with operation over ten years ago at the time of insurance issue. This group provided a mortality within standard limits.

Last year, at our New York meeting, Mr. Andrew Webster, Vice President for Selection of the Mutual Life Insurance Company of New York, presented one of those reports which are always typical of his thinking — practical, analytical and basically helpful. This covered some of the methods used in arriving at

the extra premiums assessed against medically impaired risks. He selected one of the important cancer categories of the study and considered the mortality ratios presented therein in terms of the confidence interval applicable to them and in terms of the additional deaths per thousand they represented. The confidence interval is, of course, a synonym for the probable error or probable deviation, terms which may be more familiar.

The G 2 table of figures from the 1951 Impairment Study (table IX) which Mr. Webster analyzed considers carcinoma, with operation, once, within 6 to 10 years of application, substandard, by duration of exposure in years. The lower half of the table, marked table IX (b) shows the 3 to 5 and 6 to 10 year exposures with their mortality ratios and the confidence intervals calculated for each.

TABLE IX (a)

(G 2) Carcinoma, with operation, once, within 6-10 years of application.
Substandard. Total entrants 327*
Experience by Duration.

Policy Year Durations	Exposed to Risk	Actual Deaths Policies	Actual Deaths Lives	Expected Deaths	Mortality Ratio
1– 2	609	1	1	1.84	54
3– 5	610	11	10	3.28	335
6–10	486	8	8	4.26	188
11–15	127	2	2	2.01	100

TABLE IX (b)

Duration Years	Actual Deaths	Expected Deaths	Mortality Ratio	Confidence Interval
3– 5	11	3.28	335	+94 to −72
6–10	8	4.26	188	+66 to −47

*1951 Impairment Study.

As Mr. Webster notes, the experience presented here is quite limited but it does indicate a decreasing mortality is to be anticipated and a temporary extra premium may be used to compensate for it. It is interesting to note how this small experience is confirmed in the mortality curves of the two graphs presented in the earlier part of this report.

To approximate this temporary extra he adjusts the actual deaths according to the confidence interval range of the mortality ratio, taking the upper, or as he very frankly says, " pessimistic", limit to calculate the number of deaths with that higher mortality ratio. This adjusted deaths figure is based on the exposure of the study and must be converted to extra deaths per thousand in order to secure an approximate net temporary extra premium.

These figures are derived from a risk exposure between the years 1935 and 1950, and this report indicates some progress in cancer control has been made in the past decade and more is to be anticipated in the next. Therefore, these potential extra deaths per thousand should be regarded in an optimistic as well as a pessimistic light and perhaps some combination of the two may be made to fit carefully classified groups of cancer cases. To illustrate this point table X was prepared to show the extra deaths per thousand in terms of the higher — pessimistic, and lower — optimistic, mortality ratios.

TABLE X

Duration Years	Mortality Ratio	Confidence Interval	Mortality Ratio (Range)
3– 5	335	+94 to −72	429 to 263
6–10	188	+66 to −47	254 to 141

Higher: Pessimistic			Lower: Optimistic		
Mortality Ratio	Adjusted Deaths	Extra Deaths Per M	Mortality Ratio	Adjusted Deaths	Extra Deaths Per M
429	14	17.6	263	9	9.4
254	11	13.9	141	6	3.6

1951 Impairment Study

Mr. Webster takes the 17.6 extra deaths per thousand from these calculations and says, "The conservative approach indicates that the net temporary extra premium must be at least $18.00 per thousand." Based on study and consideration of the elements of the cancer problem outlined in this report it is my conclusion that we know enough to make a controlled, intelligent move into more selective and optimistic tables of cancer extra mortality premiums.

As already indicated, the number of applicants with a history of cancer will continue to increase for the incidence of cancer is increasing along with enlargement of the population in the older age groups. More applicants with the history of cancer will be seen and, naturally, more of the unusual types will be scattered among them. It is advantageous to become familiar with cancer pathology so that the physician's report with histologic diagnosis will have exact significance. Of great value, too, is general background knowledge such as the conclusions drawn in the "Cancer in Connecticut" study, i.e. a more hopeful prognosis is justified in cancer of the colon, rectum, prostate, uterus — both cervix and corpus; while cancer of the lung, stomach, esophagus, ovary and soft tissues continues to present a more discouraging picture. The treacherous metastatic potential of the malignant melanoma must be countered by an adequate waiting period or a very specific, detailed attending physician's statement. The definite diagnosis of thyroid papillary adenocarcinoma warrants a more favorable action than would be given to thyroid alveolar or follicular adenocarcinoma.

The Medical Director must be prepared to correspond with the surgeon or the pathologist in an effort to secure specific statements concerning the type of cancer removed, whether it was localized or showed signs of blood vessel invasion or regional lymph node involvement, whether clinical examination or x-ray study showed any evidence of metastases. A knowledge of which cancer types have bone and lung metastatic tendencies can lead to a request for a chest x-ray which will help provide a sound basis for mortality evaluation. The applicant's concern to keep in follow-up touch with his physician is a favorable factor and an effort to learn if such is the case can be very helpful.

Having secured these facts one can then properly classify the individual problem and fit it to a reasonable and stable pattern which will give optimum selection results. Underwriting action is based on the conviction that cancer is not just a simple entity. It is a complex pattern of many types, degrees and classifications. It is certain that factors such as site, duration, histologic structure, lymphatic spread, blood vessel invasion — *all* are involved and interrelated in their influence on the life expectancy of the in-

dividual concerned. For that reason, practically no hard and fast rules can be established which are applicable to every case. This is true even though our rate revision is the result of much study, research and consultation with cancer experts. Future changes in rating classifications are entirely justifiable and are to be expected when based on medical judgment following detailed analysis of a specific case.

Members of this Association, in their day to day weighing of imponderables, evaluating intangibles and assessing those factors which influence mortality need never fear the unhappy fate described by Albert Einstein: "The fairest thing we can experience is the mysterious. He who knows it not and can no longer wonder, no longer feels amazement, is as good as dead, a snuffed out candle."

APPENDIX I

Numerical Data from which Graphs in
Figures 1 and 2 were prepared:
"Cancer in Connecticut 1935-1951"
"U. S. Life Tables 1949-1951"

MALES

Years	General Population % Surviving	Cancer % Surviving	% Surviving: Cancer classified by Stage at Diagnosis		
			Localized	Regional	Remote
1	96	45	63	35	11.5
3	87.9	29	46	17	2.9
5	79.7	22	37	11	1.4
8	67.8	17	28	7	0.8
10	60.2	14	24	5.7	0.5
13	49.8	10	18	4.1	0.5
15	43.6	9	16	3.5	0.0

FEMALES

1	97.8	61	77	61	14.1
3	93.1	42	61	36	3.7
5	88.0	34	52	26	1.6
8	80.1	27	43	19	0.8
10	74.6	23	38	16	0.5
13	66.3	20	32	13.5	0.1
15	60.9	17	28	9.8	0.0

APPENDIX II

Calculations used in analysis of Section G - 2, 1951 Impairment Study. G - 2 Carcinoma, with operation, once, within 6 - 10 years of application.

Duration	Exposed to risk	Actual Deaths	Expected Deaths	Mortality Ratio
3 - 5	610	11	3.28	335
6 - 10	486	8	4.26	188

Actual Deaths ÷ Expected Deaths = Mortality Ratio

I. Group 3 - 5

11 ÷ 3.28 = 335%
335% has a confidence interval of + 94 to — 72

1. Pessimistic, i.e. higher mortality ratio.

335 + 94 = 429
x ÷ 3.28 = 429
x = 14 Adjusted Actual Deaths

Actual Deaths — Expected Deaths = Extra Deaths per number exposed
14 — 3.28 = 10.72 extra deaths in 610
Extra deaths per # exp. : # exp. : : Extra deaths per M : M
10.72 : 610 : : x : M
x = 17.6 extra deaths per M

2. Optimistic, i.e. lower mortality ratio.

335 — 72 = 263
x ÷ 3.28 = 263
x = 9 Adjusted Actual Deaths
9 — 3.28 = 5.72 extra deaths in 610
5.72 : 610 : : x : M
x = 9.4 extra deaths per M

II. Group 6 - 10

8 ÷ 4.26 = 188%
188% has a confidence interval of + 66 to — 47

1. Pessimistic, i.e. higher mortality ratio.

188 + 66 = 254
x ÷ 4.26 = 254
x = 11 Adjusted Actual Deaths
11 — 4.26 = 6.74 extra deaths in 486
6.74 : 486 : : x : M
x = 13.9 extra deaths per M

2. Optimistic, i.e. lower mortality ratio.

188 — 47 = 141
x ÷ 4.26 = 141
x = 6 Adjusted Actual Deaths
6 — 4.26 = 1.74 extra deaths in 486
1.74 : 486 : : x : M
x = 3.6 extra deaths per M

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DR. SIMMONS — Thank you, Dr. Higgins. The paper of the essayist is now open for discussion.

DR. WILLIAM H. SCOINS — I would like to express my appreciation for this most excellent paper by Dr. Higgins, and I think the very liberal underwriting attitude should be highly commended. However, during the presentation of the paper some questions came to mind, which may be of interest:

1. Should this so-called carcinoma in situ be a comfort to the underwriter who has the responsibility of classifying the risk?

2. Should one be guided principally by the grading of the tumor?

3. Would it be practical to attempt to classify tumors by terminology?

DR. SIMMONS — Thank you, Dr. Scoins. Does anyone else have any comments to make?

DR. JOHN S. PEARSON — I would like to ask questions concerning the problem of papilloma of the bladder, which is synonymously labeled Grade 1 carcinoma. Also, can one individualize enough to accept the very highly malignant metastasizing lesions, such as melanocarcinoma, or retinoblastoma sooner than other slower growing cancers like carcinoma of the stomach and breast?

DR. HIGGINS — Of course, the material presented attempted to take advantage of these four or five reports that have come out in the past year giving us a little better background in approaching cancer, but not the individual cases so much. As for carcinoma in situ, the important word in that group of two is *carcinoma.* If two or three years have passed and the patient reporting regularly to the attending physician for cervical smears, one might be tempted in the thirty or forty year age group to consider her a more favorable risk. But, without very good evidence that the

condition was quiescent, I would certainly classify it in the carcinoma group and keep it there. I think the *in situ* is a pathologist's effort to indicate that what he has seen is not completely diagnostic.

The grading of cancer again is not a matter of much concern because we do not get cancer cases until about four or five years have passed. The microscope will not give a prognosis but it will tell that a certain section of tissue has changed, how it has changed, and what it looks like to an individual pathologist. If the patient has lived four or five years in good health and had follow-up studies, I think again that we can afford not to be greatly concerned over a Grade 4 or a Grade 3 malignancy occurring three, four or five years in the past.

As for the terminology of cancer, I think it is basically important that we assemble some information and some material to help in handling the reports that come from hospitals and clinics.

Papilloma of the bladder is called Grade 1 carcinoma in some clinics. It is very hard to make a distinction on those individual cases. The best solution is to give them time, two or three years as a minimum, and see what the results will be. One certainly should have a cystoscopic report before attempting to classify it.

Melanomas, as mentioned before, call for a minimum period of five years' waiting and the 1955 cancer categories we had here were a four year waiting period. Part of the revision we are working on is to divide a group of cancers with a five year waiting period. Others may be acceptable after shorter periods, three or four years, possibly. This is still in the process of being considered and discussed and it will be a matter of perhaps two months before the actual work on the revision of the cancer section of the manual is completed.

DR. SIMMONS — In his report to the Association last year, Dr. Albert F. Seibert, Chairman of the Committee on Accident and Sickness Insurance, indicated that his Committee felt that a portion of our annual program should be devoted to the broad subject of Sickness, Accident, and Major Medical Underwriting. Dr. Ralph M. Filson of our Program Committee very generously accepted the assignment to prepare such a program for this meeting. It has been the purpose of Dr. Filson to integrate his pro-

gram so that there would be a continuity of thought without repetition. Our first speaker on this symposium is an officer of my own company who willingly accepted the task of preparing a discussion of those general and overall concepts which have made underwriting of this type possible. He will further develop some lines of thought which may have bearing on the future trends in this broad field.

Mr. Irwin joined the Equitable Life Insurance Company of Iowa in 1919, upon graduation from Coe College. Following his service in World War I he was made an Assistant Actuary, an Associate Actuary in 1938, and in 1948 he became the Actuarial Vice President of the Company and Actuary in 1955. He was honored at the last meeting of the Board of Trustees by being named to that governing body. He has been intimately associated in the health plans both in and out of our company and will bring us a message of importance.

I take pleasure in introducing my friend and colleague, Mr. P. C. Irwin, whose subject is "Economic Tolerance."

ECONOMIC TOLERANCE

P. C. IRWIN

Vice President and Actuary
Equitable Life Insurance Company of Iowa

As professional people you are familiar with the term "tolerance." There are many tolerances encountered in your profession. You use many tolerance tests in diagnosis. You find that people build up an immunity or tolerance to certain diseases and these tolerances are important in the guarding of the future health of our population. Today, the subject chosen for discussion is another type or group of tolerances which we might well call "Economic Tolerances."

First, it must be made clear that my remarks are based entirely on my own opinions. They do not necessarily represent the opinions of the company with which I am connected. Some of you will disagree with these opinions, but the fact that you permit me to express them demonstrates the democratic privilege of free speech.

While I am not an expert on accident and sickness insurance, and am not qualified to speak to you on the technicalities of that type of coverage, my experience and training do qualify me to view some of the problems in proper perspective. It is this overall picture which is the subject of this discussion, and it will exclude detailed references to statistics in regard to the history and the present scope of accident and sickness coverage. However, a little background on this subject will be useful in orientating our thinking. The impetus for the growth of hospital and surgical-medical prepaid insurance was the impact of an economic necessity. In the case of hospital insurance on the group basis, this was made necessary by the financial difficulty in which the hospitals found themselves during and after the economic depression of the 1930's. Some system of prepaid coverage was necessary and the stimulation came through the nationwide organization of the Blue Cross

Plans. Similarly, the impending danger of socialized medicine brought about the organization of the Blue Shield Plans. These two provide for what is known as the "service" type of benefits. The subscriber, at least the low income bracket subscriber, is guaranteed that his hospital or his doctor bill will be paid, and, if the plan is short of funds, the hospital or doctor is paid on a *pro rata* basis until the plan can again be made whole by an increase in premiums or an improvement in experience. In other words, the hospitals and doctors underwrite the plans through a participation agreement.

These plans have not been without their problems in the last few years. Designed originally to take care of the lower income groups on a rather modest basis, they have been plagued with the ever increasing cost of hospital and medical care and an increased utilization rate. Accordingly, numerous increases in rates have been necessary. Moreover, as incomes generally increased and the interest in prepaid benefits became greater, the higher income groups became prospects for these contracts. This posed a problem for the doctors since there has for many years been a practice of varying fees to some extent by the ability of the patient to pay. As the service income limits increased and the fee schedules to doctors increased, many doctors felt that their fees were being fixed by the Blue Shield Plans and that a third party was coming into the picture between the doctor and his patient, thus disturbing the freedom and confidential nature of doctor-patient relationships.

Although the Blue Cross and Blue Shield Plans must be given considerable credit for stimulating the development of voluntary prepaid insurance, the insurance companies have done a magnificent job in increasing this coverage on both a group and an individual basis. The insurance company contracts are on an indemnity basis rather than on a service basis, but the benefit schedules available are so varied that it is possible to fit a schedule into almost any type of situation. As a result there is little difference in actual practice between the service and indemnity type of contract, since the hospitals and doctors in many cases accept the indemnity schedule in full payment for services rendered.

The Health Insurance Council in its report as of July 31, 1956, showed a total of over 115 million contracts of Hospital Expense Insurance in force. Of these, some 60 million were issued by insurance companies, about 50 million by Blue Cross-Blue Shield, and about 5 million by independent plans. Deductions for duplicate coverages indicate that over 107 million individuals are covered.

On surgical expense benefits, a total of some 100 million contracts are in force divided as follows: 57 million issued by insurance companies, 39 million by Blue Cross-Blue Shield, and 4 million by independent plans. Again deducting for duplications, there are approximately 92 million individuals covered for surgical expense.

Finally, in the field of medical expense coverage there are 59 million contracts divided as follows: 25 million by insurance companies, 29 million by Blue Cross-Blue Shield, 5 million by independent plans — a net total, after deducting for duplications, of nearly 56 million.

These figures are very arresting and show definitely the progress which can be made in voluntary health care through the efforts of all of the various organizations involved in this program. This growth has nearly all been accomplished in the last 15 years with a greatly accelerated growth in the last 10 years. In 1941 the total coverage in these areas was only 11 million for hospital care, 5 million for surgical benefits, and 3 million for medical benefits. Note also that the insurance companies have gone ahead of Blue Cross-Blue Shield plans. Furthermore, the insurance companies have entered the major medical field with coverage of over 5 million — a field which as yet has not been entered to any great extent by Blue Cross-Blue Shield. These figures do not take into consideration loss of income insurance, personal and group accident and dismemberment coverage and other accident benefits included in automobile liability coverage and workmen's compensation.

Although the growth of these coverages has been phenomenal in the last 10 years, there is much yet to be done in expanding

coverages and increasing benefits. Healthy competition between the insurance companies and Blue Cross-Blue Shield has done much to accelerate this expansion. However, there are signs recently that an unhealthy competition may be developing between these two classes of insurers. Both are trying to accomplish the same ultimate result, namely, to give the American people the best health care possible on a voluntary basis and thus avoid the dangers of socialized medicine. This problem deserves the cooperative effort of all. It deserves our "Economic Tolerance" because if we get at odds on this problem among ourselves, we may well find an outside element taking over.

You, gentlemen, as members of the medical profession and as Medical Directors of your respective companies, are in a key position in this cooperative effort. This point was emphasized in the talk which Dr. Williams, Medical Director of the Life Insurance Company of Virginia, delivered before the Medical Section of the American Life Convention in June of this year in which he said, "The success of the voluntary method will depend on the medical profession's self discipline in controlling charges and the insurance industry's performance in designing and administering its product in a manner that appears reasonable to physicians, hospitals and the public."

Doctors are individualists and rightly so — they will listen to advice from the members of their own profession quicker than they will the advice of outsiders. You can counsel with them on a professional basis. The doctors in private practice are not insurance experts. They do not understand certain insurance concepts. They are suspicious of what they do not understand because their whole training has been to accept new ideas only after they have been well proven — and with this conservatism we will all agree because many times lives are affected by their decisions and procedures.

Some weeks ago an article appeared in *This Week Magazine* entitled "Be Sure about 'Cures.'" The article was by Dr. Donald A. Dukelow, Bureau of Health Education of the American Medical Association. In making his point about being sure, the

author quoted from Kipling's poem "The Elephant's Child."

"I kept six honest serving men
They taught me all I knew
Their names are What and Why and When
And How and Where and Who."

This is what the doctors are inquiring about in connection with prepaid medical care, namely, What, Why, When, How, Where and Who. You, gentlemen, can help them find the answers to these questions. Many of you have already given of your time to this matter. Much of the success of any plan of prepaid medical care rests in the hands of the practicing physicians. They send their patients into the hospitals. They control the length of hospitalization. They control the amount of medical care and supplies used during hospitalization. If the doctors understand the fundamentals of prepaid medical care, they can do much to prevent over utilization. If they understand that payment of the last dollar of the expense of medical care is more important to the patient than the payment of the first dollar, they can do much to promote the development of major medical plans and sell the insuring public on the principles of deductibles and coinsurance which are so necessary in the cost control of these plans. Again, if they appreciate the safeguards which must be established, they can do much to make possible the sale of contracts covering diagnostic procedures — an area which is of prime importance in the health care of the nation and which can do much to reduce long periods of hospitalization and major surgery.

One of the problems needing study with an open mind is the question of fee schedules. In the Blue Shield Plans where the contracts are on a service basis and where the service income limits are being increased to substantial amounts (for example, providing full service for any subscriber whose income is less than $6000 or $7500) this presents a real problem because the doctors must accept the amount provided in the fee schedule as full payment for their services. Naturally, they are inclined to set the fees on the high side which will of necessity increase the premiums. Furthermore, each specialty group is likely to think

that the other fellow is getting more than his share in the fee schedule. The general practitioner thinks so of the surgeon, the surgeon of the neurologist, the neurologist of the anesthetist, and the anesthetist of the general practitioner. So, the cycle is completed and each one needs a psychiatrist; so, the psychiatrist ends up with the best fee of all.

The problems of establishing a fee schedule are not limited to the service benefit type of contract. They are present in the indemnity contracts. Here again the fees must be fair and equitable for the various services rendered. In some cases the doctors are willing to accept the fee schedule of Blue Shield for a certain procedure for a patient in a certain income bracket, but are not willing to accept this same fee under similar circumstances from an insurance company indemnity policy. This may have a tendency to increase fee schedules in the indemnity contract with a corresponding increase in premiums, thus making it more difficult for the insurance companies to compete with Blue Shield plans.

Moreover, the doctors fear that the fee schedules of the insurance company indemnity contracts may eventually fix their maximum fees. At a recent meeting of a group of doctors, one spoke seriously on the question of the regimentation of the medical profession. He listed the various forms of regimentation in the order in which he feared them most. First came regimentation through the practice of medicine by hospitals or other corporations; next, regimentation by insurance companies; next, regimentation through the Federal Government by means of socialized medicine; and finally, as the best solution to the problem — self regimentation. Note that the insurance companies have the dubious honor of being placed ahead of socialized medicine in the list of dangerous trends.

There is ample assurance that these principles of deductible, coinsurance, diagnostic coverage and reasonable fee schedules will work in practice because in my company we have a self-administered employee medical care plan. We do not write sickness and accident insurance but we have been over the years pretty closely exposed to its problems. Furthermore, we have in our

employ Medical Directors who can direct and control the plan.

Briefly, it provides coverage, including diagnosis, both in and out of the hospital. There is a modest first dollar deductible applicable to each employee or dependent who receives benefits in or out of the hospital during a calendar year. After the deductible is paid, the Company pays the next $500 of hospital, surgical or medical benefits in accordance with a fee schedule which is discussed with the patient and the doctor before service is rendered if possible. Then, after the payment of a varying corridor deductible on a family basis for the calendar year in which benefits are received, a major medical benefit comes into play.

I realize that this is a well controlled group since the employee is examined before he is hired and must have an annual physical examination if his coverage is to be continued, but I believe the key to the success of our plan lies in the cooperation which our Medical Directors have been able to obtain from our local doctors.

Be diligent as professional ambassadors to help the members of the medical profession find the answers to these six questions — What, Why, When, How, Where and Who.

In a broader sense we are all interested in the answers to these six questions, and in exercising tolerance in discovering these answers.

Picture if you will a delicate and accurate balance scale similar to those used by the doctor in days past who compounded his own prescriptions. Picture tolerance as the arm of this balance scale. The weight on one side of the scale cannot be changed without affecting the other side. Let us look at a number of combinations for the two sides of the scale which must be kept in proper balance.

First, insurer and insured. Benefits must be reasonable from the standpoint of the insured and the premium must be reasonable from the standpoint of the insurer. If either gets out of balance, someone is sure to suffer until the balance is reached again.

Second, employer and employee. Again we can say that benefits must be reasonable for the employee and the cost reasonable

for the employer. There has been a tendency on the part of the unions to push for substantially increased welfare benefits, and so far the unions have been reluctant to recognize the deductible principle. If this stepping up of benefits with the corresponding increase in cost continues, it simply means that this cost will eventually be reflected in less take home pay for the employees or reflected in the third combination in the balance scale — producer and consumer — the cost being passed on to the consumer or the profit of the producer substantially reduced.

We each find ourselves in one or more of these combinations. Probably we are on both sides of the first one since we are working for insurers and are probably all insured. We are to some extent on both sides of the second one since we are all employees of the various corporations for which we work, but we are in management so we are cognizant of the problems of the employer. Certainly we are on both sides of the third combination — producer and consumer. We are all consumers and certainly we would all like to believe that we are also producers.

If we want to carry this concept a little further, and perhaps get a little more into the abstract, our next combination could well be security and opportunity. Security has been much in the air recently. In fact, these health care plans that we are talking about are really prepaid security, and security is certainly a desirable thing to attain to a reasonable degree. However, if security is attained at the expense of opportunity, then eventually security will be more costly than is warranted.

The final pair of the combination follow closely security and opportunity. They are authority and responsibility. Every individual, group, or corporation which is given a certain amount of authority also must assume a certain amount of responsibility; and, conversely, responsibility cannot be properly carried out unless the person charged with that responsibility has a certain amount of authority.

So I would suggest to you today that you pause for a minute in your busy lives and look at this problem of tolerance. Sam Walter Foss, an American poet and journalist, with a journalistic

career on the Boston Globe and the Christian Science Monitor wrote a number of published poems, among which was one entitled "The House By the Side of the Road." I would recommend to each of you that you pause in your house by the side of the road and follow the admonitions of Sam Walter Foss:

"Let me live in my house by the side of the road
As the race of men go by.
They are good; they are bad.
They are weak; they are strong.
Wise; foolish — so am I.
So why should I sit in the scorner's seat
Or hurl the cynic's ban.
Let me live in my house by the side of the road,
And be a friend of man."

Tolerance, gentlemen, is the most needed ingredient in the prescription for today's economy.

DR. SIMMONS — Thank you, Mr. Irwin.

Inasmuch as the several papers of the morning will be treated as a unit, I will suggest that there be no discussion of the individual papers, but that we withhold discussion until the morning program is complete.

Since Dr. Filson has worked quite closely with the next three speakers in the preparation and correlation of the material to be presented, I have asked Dr. Filson to introduce these speakers. Dr. Filson, will you come to the rostrum?

DR. RALPH M. FILSON — I feel that the Accident and Health phases of our insurance business deserve increasing degrees of understanding, and here I will pause, because I believe that that one word embodies basic elements without which there can be no effective superstructure. *Understanding,* according to my interpretation, comes only from study, and so we might say that our Accident and Health business deserves increasing degrees of study, of support, and of explanation of the purposes and problems from every member of this Association.

Executives of insurance companies spare no effort to build new,

improved, and more comprehensive protection. They create and support organizations like the Health Insurance Council, in which this Association has membership, and the newly established Health Association of America. Members of the medical profession have a large interest in understanding and cooperating in these efforts.

The complete story cannot be told at this meeting but certain of its illustrative points can be brought out. Two important newer attempts to meet expressed public needs will be discussed. These lie in the realm of major medical insurance and noncancellable guaranteed renewable Accident and Health coverages.

As our program indicates we are to have three additional speakers. Each one will deal with a specific subject related to Accident and Health business, but these will be closely integrated.

The first speaker is a graduate of the University of Pennsylvania, who commenced his insurance career with the Pennsylvania Mutual Life Insurance Company. He has had a widely varied experience within the insurance business. He served as General Manager in the Insurance Department of one of the country's largest states. He was responsible for constructive broadening of interests and functions of the Bureau of Accident and Health Underwriters. He has contributed notably in drafting both industry regulatory measures and legislative enactments affecting the insurance industry. His extensive writings cover various phases of the Accident and Health business and has been a Visiting Lecturer on these subjects at the University of Connecticut, New York University and the University of South Carolina. Among his personal interests, proving his versatility, are music and the drama. He has composed two symphonic works that have been presented by the Philadelphia Symphony Orchestra, and he is a member of the American Federation of Musicians.

He was appointed Director of Information and Research of the Health Insurance Association this year. I am delighted to introduce Mr. Joseph F. Follmann, Jr., who will talk on "Major Medical Expense Insurance — Its Development and Problems." Mr. Follmann.

MAJOR MEDICAL EXPENSE INSURANCE— ITS DEVELOPMENT AND PROBLEMS

JOSEPH F. FOLLMANN, JR.
Director of Information and Research
Health Insurance Association of America

In the Fourth Act of "Julius Caesar", Shakespeare gives to Brutus these lines to speak:

> "There is a tide in the affairs of men
> Which, taken at the flood, leads on to fortune;
> Omitted, all the voyage of their life
> Is bound in shallows and in miseries.
> On such a full sea are we now afloat;
> And we must take the current when it serves,
> Or lose our ventures."

There are perhaps no lines from all literature which could more aptly describe the challenge which faces the institution of private health insurance today than these.

Before entering upon a discussion of major medical expense insurance, it might be well to examine briefly the socio-politico-economic climate in which we live today, the rapid evolution proceeding in the field of medical care, and some of the more recent past in the field of accident and health insurance. It is submitted that such a brief examination will be helpful so that we might have before us the panorama against which major medical expense insurance stands in bas-relief and so that we might more readily grasp how and why this form of insurance has logically evolved.

Socio-Political Background

The health of a people is considered today, both in the United States and in most of the nations of the world, a matter for governmental and social concern. Included in this consideration are the broad areas of preservation of health, prevention of accidents and illnesses, provision for adequate medical care for all, and rehabilitation of those who become stricken.

An important segment of this broad consideration is the problem of financing the costs of medical care. It is with respect to this segment, as well as the problem of continuing a reasonable portion of earned income during periods of disability, that private voluntary health insurance is concerned. This is not to say that private voluntary insurance does not have an interest in all other segments of the general subject. Contra, the preservation of health, the prevention of accidents and illnesses, the nature, quality, and cost of medical care and facilities, and the rehabilitation of the disabled are all matters of vital interest, as are the roles played or proposed by government. However, they are matters which primarily lie in other domains. Hence attention is directed here to the subject of financing the costs of medical care as this relates to the private insurance mechanism.*

The costs of medical care are generally borne in one, or a combination, of the following nine ways:

1. Use of personal funds from income, savings, investments, or holdings.†
2. Insurance policy benefits or prepayment plans.
3. By the employer.
4. By labor, fraternal or other organizations.
5. Personal loan.
6. Funds provided by relatives or friends.
7. Charitable institutions.
8. Care or treatment without charge.
9. Government.

In many other countries, government plays a more direct role in financing medical care than in our own. By January 1954, 41 nations had compulsory health and maternity insurance pro-

*Other forms of private insurance play an important role in protecting against the financial consequences of illness and injury including life insurance, annuities, total and permanent disability and accidental death benefits written in conjunction with life insurance, workmen's compensation insurance, liability insurance, and medical payments benefits written in conjunction with liability insurance.

†Including life insurance surrender and loan values, proceeds from life insurance, annuities, retirement programs, and Old Age Survivor's Insurance benefits.

grams* and 3 had voluntary subsidized programs with broad coverage.† Additionally, one nation offers medical and dental services in special centers built with social insurance funds (but does not provide cash benefits) and 3 provide for maternity insurance but not health insurance. Many of these programs have progenitors dating back many years, the earliest being Germany, 1883 (latest enactment 1952). Five have come into operation since 1949 and 4 are not yet in operation. Thirty-two are presently operating under laws enacted since the cessation of World War II.

It will be noted that government programs concerned with financing medical care on a more or less universal basis are not new in concept. They are devoid, it is also to be noted, of any identification with any particular political ideology, form of government, degree of economic control or freedom, or economic, social, or cultural level. Notably absent from any of the various categories of government programs mentioned is the United States.

This is not to say that government in the United States has evinced no concern over the financial consequences of illness and injury. Contra, all forms of our government have displayed an active, continuing, and increasing interest. Through workmen's compensation laws enacted since 1911, all the states and the federal government (longshoremen and harbor workers and District of Columbia) have placed certain fixed responsibilities upon the employer for the costs of occupational accidents. In 41 states this responsibility can be insured with private insurance carriers, in 11 of these in competition with a state fund. In 7 states private carriers are excluded by monopolistic state funds.

In 4 states nonoccupational statutory disability benefit laws have been enacted since 1942. These laws generally provide cash

*Included in the 41 are Australia, Austria, Belgium, Brazil, Denmark, France, Germany, Great Britain, India, Italy, Mexico, Netherlands, New Zealand, Norway, Spain, Sweden, and Turkey. Also included are China (both Nationalist and Communist), Czechoslovakia, Hungary, Poland, Rumania, the Union of Soviet Socialist Republics, and Yugoslavia.

†The 3 nations are Australia (employs both approaches), Finland, and Switzerland.

benefits to covered employees for a limited period of time during disability. California additionally provides for fixed per diem hospital benefits up to a specified maximum. With the exception of New York, these laws are linked to unemployment compensation benefit laws. In one, Rhode Island, private carriers cannot participate in providing the coverage. In the other three, California, New Jersey, and New York, insurance companies can, to varying degrees, compete with the state fund. In those states the companies write 48 per cent, 64 per cent and 97 per cent of the covered employees respectively. Essentially similar measures have been introduced in 15 other states, the District of Columbia, and Hawaii but were not enacted into law.

Between 1939 and the present, bills directly concerned with some form of generally universal health insurance have been introduced into every session of Congress. These bills have run the gamut from bills which would have provided practically universal coverage under federal administration, to bills which would provide government reinsurance for private health insurance plans. They have included such proposals as federally subsidized state systems of medical care and disability compensation, provision for practically universal medical and hospital care including periodic physical examinations from birth to death and relieving income loss resulting from disability, appropriation of federal funds to enable the states to provide medical care for the "medically indigent", promotion of "cooperating prepayment health service plans" through federal-state subsidization, old age survivor's insurance benefits to the totally disabled, and provision for smaller insurers to pool their operations and experience. Until this year none of the proposals were enacted. This year, as is generally known, a bill was enacted to provide OASI benefits to totally and permanently disabled old age survivor's insurance beneficiaries over 50 years of age.

During this same period several important studies were conducted by the federal government. Outstanding were those of the Committee on the Costs of Medical Care appointed by President Hoover, the National Health Survey, that of the National Health Conference appointed by President Roosevelt, the Clark Report prepared at the instance of the Subcommittee on Health of the

U. S. Senate Committee on Labor and Public Welfare, and the report of the President's Committee on the Health Needs of the Nation appointed by President Truman. In 1956 Congress enacted a measure to provide for a National Health Survey on a continuing basis.

In addition to the approaches and proposals of more direct significance to private insurance, there are many governmental services at the federal, state, and local level which make provision for medical care, serve to prevent disease and illness, and aid in the rehabilitation of the disabled. Hence 24 per cent of the total $14 billion medical bill of the nation is borne by these various governments, often on a joint financing basis.* The federal government in 1955 spent some $2 billion on disability allowances, $1.7 billion for operational services, $199 million for federal hospital construction, and $207 million for grants, of which $75 million were under the Hill-Burton Act and $41 million for research.† Seventy-one per cent of all hospital beds in 1949 were furnished by government, although their use accounted for only 25.6 per cent of hospital admissions.

The federal government has undertaken a large measure of responsibility with respect to the entire population and specific responsibility for all or part of the medical care of over 30 million persons (not including totally and permanently disabled old age survivor's insurance beneficiaries over age 50 now eligible but whose numbers are not yet known). About 4 million are entitled to complete medical care. These include active duty military personnel, indigent Indians, Merchant Seamen, Coast Guard personnel, federal prisoners, detained aliens, drug addicts, lepers, and others. Additionally, 3.5 million veterans are entitled to complete care for service connected disabilities. Over 20 million are eligible on a facilities available basis, these being mostly veterans, dependents of military personnel, and retired military personnel. Ten per cent of all active physicians, 9 per cent of dentists, and 6

*U. S. Department of Commerce.

†Commission on Organization of the Executive Branch of the Government.

per cent of graduate nurses are employed by the federal government. In 1953 $152 million of medical supplies was purchased by the federal government.*

Under the Hill-Burton Hospital Survey and Construction Act federal funds have been granted to assist in the construction of hospitals, health care facilities for the chronically ill, nursing and convalescent homes, diagnostic and treatment centers, and centers for rehabilitation. This program, now 10 years old, has 3,047 project approvals to its credit at an aggregate cost of $2.4 billion of which $781.4 million was federal funds.

The various governments in the United States have provided grants to aid the education of medical and public health personnel; public assistance medical care; vocational rehabilitation; prevention of disease and accidents by such means as pure food and drug administration, water and air pollution control, vectal control, detection and control of mental disease, diagnosis, detection and control of physical disease, communicable disease control, nutrition, accident prevention, occupational health and safety services, garbage collection and disposal, school health services, educational media, and grants for research; services for mothers, crippled children; aid to the blind, the aged, dependent children, and persons totally and permanently disabled; construction of hospitals and other medical care facilities; public health medical nursing, and dental services; and licensure.

This brief resume of government approaches to the problem of medical care and its financing serves to illustrate the sociopolitical background against which private insurance in this country functions today. It would seem to indicate rather clearly that, to the degree nongovernmental means cannot or do not provide for the costs of medical care, government is prepared to assume† or designate‡ the responsibility to the end that there shall be adequate medical care for all.

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*Ibid

†Directly, through taxation; indirectly through compulsory employer-employee contribution; or both.

‡Usually the employer.

Evolution in the Provision of Medical Care and in Medical Economics

There is another area of the panorama which has marked effect upon the provision and cost of medical care and its financing and which is equally of concern to private health insurance; that is, the rapid evolution proceeding in the provision of medical care and in the economics of its financing. This evolution has proceeded at an unprecedented pace in recent years. It has had, and is having, marked effect on the cost of medical care, the nature of medical care, the attitude of the public toward medical care, and political opinions and attitudes. Its effect on private voluntary health insurance is great, although not yet measurable, so rapid has been the pace.

There is more and better medical care today. It is more readily available to more people. More people take advantage of this care than ever before and life is prolonged as a result. But medical care has become more complex. It becomes increasingly costly as more and more facilities are brought into common usage and more expensive procedures and drugs are developed. The problem of financing this cost becomes increasingly difficult to many. It falls upon private health insurance to provide the means for spreading, for averaging out, these costs.

The U. S. Department of Commerce reports that in 1954, $14 billion was spent in the United States for health and medical care. Of this, consumer expenditures represented 76 per cent and government 24 per cent. Of the $10.6 billion spent by consumers, privately controlled hospitals and physicians' services comprised 54 per cent, net cost of insurance 10 per cent, dental care 9 per cent, other professional services 6 per cent, and commodities 21 per cent. Health Information Foundation estimates that this cost to the American family averaged $207 in 1953; although 11 per cent of the families surveyed experienced charges in excess of $500, these 11 per cent accounting for 43 per cent of all charges for personal health services. Seven per cent of the people saw physicians at least 15 times during the year. These costs fall heavily upon some persons.

Today one out of eight persons in the United States is hospitalized each year. Hospital utilization in 1955 reached a new high of 21,072,521 patients, this being an increase of 3.5 per cent over the preceding year. Meanwhile the cost per patient day rose to an average of $24.15, an increase of 6 per cent over 1954; and the average total hospital bill increased 5.92 per cent to $181.13. A decenial comparison shows that since 1946 the average cost per patient day has risen from $10.04 to $24.15, an increase of 141 per cent; and the average total hospital bill has increased from $88.35 to $181.13, an increase of 105 per cent.* It is forecast that hospital costs will continue to increase at about 5 per cent annually for the indefinite future.†

The average length of stay in general short term hospitals has dropped, however, from 40 days in 1900 to 14 days in 1934, to 8.1 days in 1947, to 7.8 days in 1955.

These scant figures on hospital costs illustrate many of the evolutionary factors which have been at work. They, of course, show the effect of an inflating and expanding economy, but while the consumers' price index rose 37.6 per cent, the hospital cost per patient day increased 132 per cent. They display the increased use of skilled professional personnel in hospitals resulting from swifter and more highly developed treatment. They display reduced hours of hospital work in order to compete in the labor market. They represent an increase in the quantity and quality of hospital services per patient day as a result of the technical and scientific progress being made in medicine. The personnel required for one patient day of care has grown over 24 per cent in the past 9 years: the number of routine nursing procedures per patient day has increased 30 per cent. The increasing complexity of hospital service is also illustrated by the increase in the past 9 years of the average total capital assets of all short term, general hospitals required per bed, an increase from $6,512 to $11,170. These figures also illustrate the fact that the shorter the patient's stay, the more intensive is the treatment required, in that such costs as operating room and x-ray are spread over fewer days.

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*Employee Benefit Plan Review, September, 1956.
†Ray E. Brown, Journal of the A.H.A., April 1, 1956.

Also displayed is the use of more varied and expensive drugs, equipment, and procedures.

The hospital admission figures are also reflective of certain basic factors. One of these is the increase in our population. With an increase of over 4 million last year due to live births alone, the continuing effect of our population increase will be felt for a long time to come in the field of medical care as well as many other fields. Another factor made evident by these figures is the increasing availability of hospital care, made possible by improved transportation and hospital construction programs, and the changing public attitude toward hospital care, with decreasing fear and ignorance being in the ascendancy. Also reflected are the effects of our general economic well-being and of the phenomenal growth of private voluntary health insurance.

These figures are mentioned here for another reason: They illustrate the marked effect the changes in medical care are having and will have on the financing of medical care, including the underwriting of insurance. This, in turn, indicates the demand for further evolution in certain directions to the end that lower cost facilities and methods, though just as adequate, will come into more general usage. This continuing evolution must come about if present developing methods of financing medical care on a private and voluntary basis are to continue.

Some of the changes underway are the design and creation of facilities more nearly related to the degree of illness; the further development and coordination of nursing and convalescent homes and outpatient care; more ambulatory and self-service hospital care; the substitution of less skilled hospital personnel to take over the lesser skilled duties from the professional personnel; synchronization of hospital patient admissions with discharges to reduce to a minimum the loss of bed days; location of hospitals closer to the population they serve and the building of more but smaller hospitals on an interrelated basis; the development or grouping of more specialized treatment; organization and development of home care, nursing service, home-maker service, and "meals on wheels"; the development of diagnostic, therapeutic, and rehabilitation centers; and the development of relative value schedules for medical services as was recently done in California.

These changes, properly brought about, can serve to place medical service in this country on a still higher plane while at the same time keeping its increasing costs within control.

With all this change surrounding the providing of medical care and its cost, there has been equally sudden change with respect to the manner in which this cost is borne. Private contribution to hospital construction and deficit is no longer available on its former scale.* Replacing this in part has come government grant.

Charity or nonpaying patients of hospitals and physicians, while reduced in number, are no longer chargeable at the other end of the spectrum to the extent they one time were. There is little question but that prepayment and insurance methods have provided the beginnings of a sound financial base for all health services in our country. Today about half the income of our general hospitals, for instance, is estimated to be derived directly from these means.† If the use of 'not known' insurance funds was added to this, the proportion would be much greater.

A survey conducted for Health Information Foundation shows that 19 per cent of all American family medical charges was paid by insurance in 1953. Spokesmen for the government have recently stated critically that only 22 per cent of the $10.6 billion personal medical care expenditure was covered by insurance. These figures, of course, bear critical and current analysis. The purpose here is to indicate generally the role prepayment methods have come to assume.

It can be seen from this brief account of the evolution going on in the field of medical care and medical economics that marked affects are being produced on the problem of financing medical care. Medical care, with its tremendous advance, has become increasingly expensive. Means for using the least expensive care possible, commensurate with medical adequacy will have to be exploited to the fullest. Meanwhile insurance and prepayment methods will have to continue, or even accelerate, their phenomenal development.

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*The U. S. Department of Commerce has reported that in 1954 patient income, including amounts paid direct by insurance plans, equalled 90 per cent of the income of nonprofit short term general and specific hospitals. The remainder came from gifts, bequests, and grants.
†Ray E. Brown, Ibid.

Hence we, as private insurers, find ourselves in a climate of a general social concept that no one shall lack for adequate medical care; of strong and active socio-political forces moving in the direction governmental provision for the costs of medical care; of a rapidly evolving form of medical care involving increasingly expensive technics and facilities; of an evolving pattern of medical economics tending away from extremes in the direction of a more level allocation of the costs of care; of a personal tax structure which makes the accumulation of savings against the cost of emergencies more difficult; and of a changed personal economy in the direction of more total consumption of earned income, installment purchases, and a resultant higher percentage of indebtedness.

The Response of Private Insurance

The private insurance mechanism has not been unaware of the challenge with which it is faced. Rather, it has been vibrant with development and experiment. As a financial institution, however, it has had to progress logically and with a certain caution and alertness to the consequences of unforeseen hazards. This is befitting the important and long range responsibility which it, of necessity, assumes.

The fact that the coverage provided by insurance companies has been increasingly effective and adequate cannot be questioned by any reasonable person. Developments and improvements have been appreciable. Experiment in new approaches has been vital and varied. These developments have been brought about by insurance companies individually and voluntarily. The benefits of a free competitive system, prevalent in accident and health insurance, have accrued directly to the insuring public. Entire new coverages have come into being, more traditional coverages have been broadened and often reconceived, coverages have been redesigned to meet the current needs and demands of the public, underwriting principles have been revised, practices and methods have been altered. To mention a few: the conversion privilege and continuation of coverage on retired employees in group insurance, the introduction and growing acceptance of deductibles and coinsurance, guaranteed renewable insurance with the right of the company to change the premiums, an increase in the writ-

ing of noncancellable insurance*, reduced and unlevel commissions, increased age limits for the writing and continuation of hospital expense insurance, the development of paid up insurance, the writing of substandard risks, increased reinsurance facilities, the development of small group insurance and generally an extension of the group underwriting principles, extension of coverage to medical services and forms of care not formerly covered, the extension of limits to cover longer hospital stays, and extensions of medical care benefits to more realistic levels.

In addition to these, a most important development has been the entrance into the field of health insurance of a great many companies which did not formerly write this form of insurance or which wrote it on a limited or restricted basis, and the entrance into the field of medical care coverages by companies long writers of the more traditional forms of coverages.

In giving consideration to the effectiveness of insurance company coverages in financing medical costs it must be recognized that generally and traditionally they have been directed more particularly to the short term patient and to the more fundamental or basic medical care costs possessed of clearer identity such as hospital, surgical, and in-hospital medical costs. Effort and experiment has been directed toward increasing the level of these benefits and increasing the number of specific areas for which reimbursement would be made. As a result the amounts of benefits generally written today for the traditional hospital, surgical, and medical expense appear quite adequate for the purposes intended.†

They have certain limitations, however. They, unlike the policyholder's problems, are segmented by types of expense; are usually limited to in-hospital expenses‡; often do not cover the costs of

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*The number of companies offering this form of coverage increased from 67 to 107 between 1950 and 1955. Source: Argus Chart.

†A 1955 joint Bureau-Conference survey reveals the following averages: Maximum daily hospital benefit, $15; Number of days covered, 107; Miscellaneous benefits, 10 times the daily benefit; Surgical maximum, $290; In-hospital doctor visits, $3.00; In-hospital private duty nurse, $10.00. Group insurance benefits are comparable.

‡It is estimated that nonhospitalized illness accounts for more than half the funds now privately expended for medical care. Emil E. Brill, General American Life Insurance Company, before the National Conference of Health and Welfare Funds Administrators and Trustees, June, 1956.

private nurses, specialists and consultants, and medical supplies and appliances; often provide too much coverage for minor ills of little financial consequence and too little for major illnesses; and often bring about duplication of coverage and overinsurance.*

This is not to say they do not serve an important role in financing medical care costs. They have, in fact, come to play an increasingly important role and one which is generally recognized. They ease the financial shock in whole or in part in the vast majority of illnesses and accidents where insurance is in force and where hospitalization is required. As they have developed in a natural, evolutionary way they have served and do serve the American public well. It may well turn out that they provide the type of protection which the public will see fit to prefer. Time and the public will be the deciding factors.

Major Medical Expense and Comprehensive Insurance

It was out of the recognition of these understandable and inherent limitations in the more traditional forms of medical care insurance coverages, however, that the conception and development of major medical expense and comprehensive insurances came about.

Secretary Folsom of the U. S. Department of Health, Education and Welfare has recently said, "One of the greatest needs and opportunities lies in the field of major medical expense insurance. . . . We must remember that in 1953 alone half a million families had medical care costs as large or larger than their entire annual income. One million families had illnesses costing more than half their annual income. . . . I believe firmly that major medical

*Ibid. See also Donald D. Cody, New York Life Insurance Company, before the Illinois Wesleyan University Second Annual Insurance Seminar, April, 1956; John L. Garman, Connecticut General Life Insurance Company, before the Bureau of Accident and Health Underwriters and the Health and Accident Underwriters Conference, January, 1956; A. M. Wilson, Liberty Mutual Insurance Company, Edmund B. Whittaker, The Prudential Insurance Company of America, and Henry S. Beers, Aetna Life Insurance Company in "Major Medical Expense Insurance", Chamber of Commerce of the United States, 1956; the report of the President's Committee on the Health Needs of the Nation, 1952; and President Eisenhower's message to Congress, January 31, 1955.

expense coverage should be used to supplement the protection afforded by basic benefits of many existing policies."

There is no need to describe here in detail the major medical or comprehensive coverages, nor to enter into discussion of the diverse forms and variations these coverages presently assume. An appreciable body of current literature is extant on the subject and so much has been written and spoken recently that any lengthy discussion would be redundant. Suffice to say that under this form of coverage, insurance is generally provided for practically all forms of medical expense in or out of the hospital. This includes charges for hospitalization, physicians, private registered nurses, surgery, physiotherapy treatments, x-ray and radium treatment, x-ray and laboratory examinations, ambulance, prescription drugs, medicines, blood, appliances, care for accidental injuries to natural teeth, and maternity complications. Generally not covered are expenses covered by Workmen's Compensation; expenses for eye refractions and glasses, hearing aids, dental care not required as a result of accident, check-up examinations, and luxury hospital accommodations; charges in government hospitals; charges resulting from war; and normal maternity expenses. Some policies also exclude expenses resulting from nervous ailments, care in nursing homes, insanity, alcoholism, and narcoticism. Some individual and family policies are limited to in-hospital expenses. Underlying all such plans today is a deductible amount,* a coinsurance feature,† and a maximum amount of benefit.‡ Still being in many respects experimental, these underlying principles vary among companies. Hence, there are "corridor" deductibles, "benefit year" deductibles, "each illness" deductibles, "integrated" deductibles, "each individual" deductibles, varying amounts of coinsurance, varying maximum limit amounts, and varying methods for applying these maximum limits, including on an "each illness" basis, an "each individual" basis, and a "lifetime" basis.

It will be seen from this very brief description that an entirely new concept has evolved with respect to the costs of medical care. The earlier and traditional segmented approach has been supplanted by a blanket approach.

*Varying from $100 to $500.
†Generally 25 per cent.
‡Usually ranging from $2,500 to $10,000.

More recently, being aware of the problems of deductibles as they effect particularly the lower income groups, companies have been experimenting with a still newer version of group major medical expense coverage. This coverage is variously referred to as "Comprehensive", "Minor-Major Medical", "Basic and Catastrophic", and "Baby-Major Medical". Some of its features are such things as lower deductibles*, a reduced amount of coinsurance,** no deductible for hospital expenses, full reimbursement of the first $250 of hospital expense, and a higher rate of reimbursement for hospital and surgical expenses than for other medical expenses. This is the most complete coverage ever offered by insurance companies for medical expenses.†

With respect to these newer coverages a review of the experience of one company is of interest. This shows that of 350 group cases sold in 1955 and early 1956, about 90 per cent were on the comprehensive rather than the in-hospital plan. Almost all had 25 per cent coinsurance although a few had 20 per cent. About 15 per cent supplemented Blue Cross-Blue Shield basic plans and over 80 per cent supplemented basic plans written by the same company. Three per cent of the cases replaced a basic plan.††

Today these coverages are written on a group basis by some‡ 98 companies and on an individual and family basis by some 77 companies. At the end of 1955, 5,300,000 persons in the United States were covered by major medical expense insurance. The rate of growth in 1955 over 1954 was 140.9 per cent. The number of persons covered in 1955 compared with 1953 was 224.2 per cent greater. There is no means of estimating the number of persons presently so insured. Rates of growth so marked as those demonstrated defy future projection with anything resembling accuracy. In addition to this, the sudden insuring of any large group of persons can alter the figures appreciably. For example,

*Often $50.
**Often 20 per cent.
†A possible exception might be the blanket medical expense coverage written for both accident and illness losses in the late 1920's. The experience here with respect to illness losses was to costly and the coverage had to be generally discontinued.
††Employee Benefit Plan Review, July 1956.
‡It is difficult to obtain an accurate count.

had the bill before Congress this year which would have made possible the insurance of civilian federal employees on a major medical expense insurance group basis been enacted, several million persons could possibly have been added to the total insured in a very short period of time. Such marked change can also be brought about by the inclusion of major medical or comprehensive coverage in a labor union bargaining agreement.

These more recent developments present to the American public these decided advantages: (1) protection against sizeable and unpredictable medical bills, (2) protection against the costs of the vast majority and more usual of the forms of modern medical care, (3) the broadest coverage for a given premium by the elimination of budgetable expenses and by providing an incentive to select the most appropriate type of care, and (4) removal of the need for duplicate or supplemental coverage.

There can be little doubt but that further developments will continue to come about. This form of insurance protection has by no means solidified nor will experimentation cease until further refinements are brought about. The end, certainly, is not yet in sight.

Some Areas For Consideration

Major medical expense insurance and comprehensive medical care coverages are still incomplete and certain fields are open for further consideration.

It must be constantly borne in mind that these forms of insurance are relatively quite new. A pattern has not yet formed, with the consequence that plans invariably differ, often in important detail. In itself this is a most healthy condition, since insurers are still finding their way, gradually gaining more experience and knowledge. Changes in approach are constantly being made. Experiment proceeds continuously. Trial and error are often the teachers.

Some of the more salient areas for further consideration are the following:

1. The development of an understanding attitude on the part of the providers of medical care. It is generally recognized that this form of insurance cannot succeed without the understanding cooperation of the doctors, the hospitals, and

all the others who provide such a high level of medical care for the American public. Doctors and hospital administrators are evidencing increasing awareness of the close relationship which they have with the insurance mechanism. This is a most encouraging and hopeful sign, for upon this awareness will depend, in large measure, the success of this newest of insurance coverages.

There is little question but that major medical and comprehensive insurance can result in a higher fee-paying ability of the patient. It can result in the use of unnecessary or luxury forms of facilities and care. It can result in the overutilization of medical facilities and, consequently, of the insurance. Any of these consequences are undesirable since they can place unnecessary demands upon doctors, nurses, and medical facilities, they can unnecessarily increase the cost of medical care, and they can bring about the increased cost of insurance protection which, if carried to an extreme, could mean the failure of the prepayment or private insurance concept of financing medical care. The remarks of others will shed a great deal of light on the many elements which make up this problem, the difficulty in coming to grips with it, and the misunderstandings which often pervade any approach to the subject.

The principle of coinsurance is being used to give to the policyholder patient a share in the medical costs and hence an incentive to keep those costs at reasonable levels. However, the providers of medical care, with their close subjective relationship with the policyholder patient, are the ones who will determine, eventually, the success or failure of this new coverage.

One of the hopes for major medical expense insurance is that it will discourage the unnecessary use of expensive hospital facilities. Doctors and hospitals have been critical of the more traditional forms of insurance and prepayment because the benefits are often limited to in-hospitals costs and hence bring about the unnecessary use of these facilities when less expensive means would have been sufficient. Major medical insurance, in removing the in-hospital concept, overcomes this criticism. The providers of medical care, on

the other hand, must take advantage of this more flexible approach by using less costly facilities where these are just as adequate. This hope cannot be realized without their understanding and cooperation. It argues for close liaison between those concerned with medical care and those concerned with insurance to the end that the public interest might best be served.

Another hope for major medical and comprehensive insurance is that it will avoid duplication of coverage. The providers of medical care are quite critical of insurance and prepayment methods when they observe duplicate coverage resulting in overinsurance. Particularly when they have based their charges on certain assumptions, only to find out later that the patient actually made money on his illness, do they feel critical of the insurance and prepayment mechanisms. Insurance companies are well aware of this problem. The fault has partially, though unpurposefully, been theirs in packaging their coverages so that the public feels the need for more than one kind of coverage, in insuring already insured dependents, and in not too carefully underwriting their business. Steps are being taken to overcome this with full recognition of the fact that it results in unnecessary and wasteful insurance cost to the public, unsound insurance practice, and unsatisfactory relationships with the medical profession. It cannot be overcome at once, however, nor can it ever be completely eliminated; particularly in the instance of fraudulently minded policyholders. It is hoped, however, that the advancement of major medical and comprehensive coverages will provide the major step in overcoming this problem.

As members of the medical profession and as medical directors of insurance companies you are in a key position to bring about increased understanding and cooperation between the providers of medical care and the insurance companies. Your counsel, your understanding of both segments of the subject, can be of inestimable assistance in bringing about a common understanding of the mutual problem. Where medical directors have come to play an active role in this respect, the results have been most re-

warding. But a relatively few doctors are not enough. All of you are needed, needed to talk with groups of doctors and hospital administrators, to help them understand what private insurance is trying to do, to gain an understanding of their problems and to convey these to the insurance lay mind, to accomplish a joint and common enterprise in which the beneficiary will be the American public.

2. A second area for consideration is the development of a public understanding, and acceptance, of the principle of deductibles and coinsurance. The basic concept of what the public wants and needs as protection against the costs of medical care has not yet crystallized. Certain it is that the public has become accustomed to forms of protection which provide payment for small bills.* This means that evidence of the existence of the protection is more frequent, and hence more to the immediate liking. However, this results in high administrative costs, it means that bills are paid which are not of serious financial consequence and hence which could be handled by budgeting, it results in higher cost of protection if the costs of financially serious illnesses are also to be insured. Perhaps the public may choose this, nonetheless. It must be recognized that the public today is geared to an installment payment economy. Many of its decisions are consequently based upon this premise. However, the ultimate selection by the public should be based upon a sound understanding of the nature of the various forms of insurance available to it and the elements which enter into their costs. In the instance of automobile collision insurance, once aware of those factors, the public clearly showed a preference for the deductible approach.

   It must be recognized, also, that the development of public acceptance while basically an individual matter, is not entirely so. The development of public acceptance will affect labor union bargaining. It will affect the attitude of employers in the purchase of group insurance. It will affect the at-

*The experience of one insurance company reveals that 30 per cent of its claims under traditional hospital and surgical insurance involved medical expenses of less than $25.

titude of public leaders, of those in public office, and of public opinion generally.

It is to be recognized that the insurance mechanism fulfills its primary function when it provides protection against the unusually high medical bill and not when used to prepay the cost of small, budgetable expenses.

3. A third area for consideration is the continued experiment and development among private insurers. It has been demonstrated that major medical expense insurance is a developing process. Its variations are many. Eventually these will have to solidify in the best interest of the public. Before this can be done, however, a great deal has to be learned from research and from experience. Medical costs, their nature and their incidence, have to be examined, more about their subjective nature must be learned. Insurance experience, on an intercompany basis, would be helpful but varieties of coverages and approaches make this virtually impossible at this time. Attention must be paid to the rapid evolution proceeding in the fields of medical care and medical economics to be certain that insurance serves the public in the best possible manner. Examination of various approaches to claim costs control will become increasingly necessary as this form of insurance grows, in order to avoid unnecessary or unwarranted claims. Expenses surrounding the writing of insurance should be, and are, a constant source of study. Both these will result in keeping the cost of insurance to the public at a minimum. Hence the insurance process is, in many ways, a constant one of self-examination, of re-evaluation, of resolving impressions into facts.

4. A final area for consideration is one which also lies with the insurance companies, that of education: education of the public, of those who employ others and hence are present or potential purchasers of group insurance, of those who provide or administer the various forms of medical care, and of insurance company personnel. Too little is known about major medical expense insurance; what its purposes are, how it functions, and how it fits into a personal insurance program as an integral and important part.

A broad educational program can serve to bring about such an understanding, and hence to supplement the preceding areas of consideration. It can serve to create a public attitude which will make major medical expense insurance a sound and workable device.

Conclusion

The development of major medical expense and comprehensive insurance is an important step forward in helping the American people meet the financial costs of medical care. As this form of protection becomes more widespread, sizeable medical bills will cease to be the financial and economic problem they are to millions of individuals today. It is the answer to the assertion that health insurance is not paying a large enough portion of the nation's health bill.

The insurance principles continued in the major medical approach are sound. The avoidance of smaller bills and utilization of the premium for large bills which might otherwise result in financial disaster is the objective. Major medical insurance should prove to be an important contribution to the well-being and increased standard of living of the American people.

DR. FILSON: Our next speaker is one of our own members, a Yankee by birth and education and a native of Vermont. Having graduated from Holy Cross and from the University of Vermont Medical School in 1945, he became associated with the Medical Department of the Equitable Life Assurance Society as Assistant Medical Director in the Bureau of Selection. He was made Associate Medical Director in 1953, and for approximately three years now he has been directing and actively participating in a new program of activities with the Equitable. This program's purpose is one of furthering good medical public relations with policyholders, both individual and group, in accident and health coverage.

With this background, Dr. William J. McNamara is eminently qualified to speak to us, supplementing what Mr. Follmann has just told us and devoting his attention particularly to "The Role of the Medical Director in Major Medical Insurance." It is a real pleasure to introduce to the members of this Association Dr. William J. McNamara.

THE ROLE OF THE MEDICAL DIRECTOR IN MAJOR MEDICAL EXPENSE INSURANCE

W. J. McNAMARA, M. D.
Associate Medical Director
Industrial Health Service
The Equitable Life Assurance Society
of the United States

Others have already described the development of this new type of insurance as a means of protection against medical, surgical and hospital expenses which are not adequately covered by the usual health insurance plans.

The purpose of Major Medical Expense Insurance is to assist the American insurance buyer to meet the cost of expensive illnesses or accidents where expenses run to hundreds or even thousands of dollars. This form of health insurance affords real protection against the expenses of a medical or surgical catastrophe.

The number of persons who are protected by Major Medical Expense Insurance has about doubled each year since the inception of the insurance in 1949. According to The Health Insurance Council Report of August 1956: "Accelerated growth of Major Medical Expense protection during 1955 multiplied the number with such protection by nearly two and one-half times over 1954 — the increase being 138 per cent."

This growth should continue as the American public recognizes more and more the value of this form of insurance protection against extraordinary medical and surgical expenses. A large number of health insurance plans written in industry now include Major Medical Expense Insurance, and there is reason to expect growth of these plans in the future.

In spite of the fact that approximately 110,000,000 Americans are covered by various forms of health insurance, there is still need for greater protection among individuals who are not in employed groups if health insurance is to be provided to a larger proportion of the population.

Major Medical Expense Insurance has four distinct features:

(1) *A maximum limit* on benefits payable. This commonly ranges from $2,500 to $10,000.

(2) *A deductible provision.* This is similar to that found in most automobile collision policies. It not only eliminates small claims but helps to reduce administrative expense associated with them. Deductibles may range from $50 to $500.

(3) *Coinsurance.* This provides that the company reimburse the insured for only part — commonly 75 per cent to 80 per cent — of all expenses above the deductible amount, and that the policyholder pay the remainder of the bill. It is believed that, when the insured has to pay out of his own pocket a portion of each dollar of expense, he will be concerned with limiting his expenses to actual necessities, without luxuries. As a co-insurer he thus carries a portion of the risk himself. Coinsurance aids insurance companies to provide benefits when they are needed, while discouraging needless expenses.

(4) *The absence of a fee schedule.* For the medical director this feature gives rise to the most serious problems. Even though in many instances the insurance policy specifies that the charges must be "reasonable," "customary," "usual," or some similar term, decision as to whether a specific charge is reasonable, customary, or usual can be most difficult and certainly demands professional assistance. On the other hand, if a fee schedule were imposed in Major Medical Expense Insurance, much of the value of this type of insurance might be lost. Within its deductible and coinsurance stipulations, Major Medical Expense Insurance is designed to protect against large expenses of illness, and imposition of a fee schedule which would limit benefits would, to a large extent, defeat the real purpose of this type of coverage.

Let us turn now to consideration of some of the specific problems of Major Medical Expense Insurance — problems whose solution is partially a responsibility of the medical department of the insurance company.

First is a brief summary of the medical underwriting of risks for this type of insurance. The principles involved in underwriting all forms of accident and health insurance are basically alike. In contrast with life insurance underwriting, however, we do not have the benefit of extensive medicoactuarial studies such as the Impairment Studies of 1914, 1929 and 1951. Nor do we have morbidity studies nearly as informative and reliable as vital statistics and clinical biostatistical studies relating to mortality. The distressing lack of exact information about the costs, prevalence and related features of many types of illness was recognized by the 84th Congress when Public Law 652 was passed, establishing a National Health and Sickness Survey.

Although individual companies have their own accumulation of accident and sickness statistics, generally there has been no great pooling of insurance experience data from which fundamental conclusions may be drawn.

Certain observations nevertheless can be made. Not everyone who is eligible for accident insurance is eligible for sickness insurance, and one who is eligible for both of these coverages may not be acceptable for life insurance or vice versa. All possible combinations may be found.

The most common unit of Major Medical Expense coverage is the family. Occupations, habits or morals, which are of critical importance in underwriting individual medical expense insurance, are not as important in underwriting the family unit.

Severe deformities that need surgical correction and the chronic diseases, along with accidents, produce the principal underwriting problems of the childhood period. In adults, the chronic wasting and degenerative diseases usually render the person uninsurable.

To make this insurance available to more people, policies now are being liberalized excluding certain conditions and the complications arising from them, and efforts are being made to handle certain impairments of applicants subject to extra premiums. In either case, the medical underwriting will require considerable attention.

In addition to these considerations, the claim costs of Major Medical Expense Insurance vary directly with the income status

of the insured; increase markedly in later years of life; and are related to medical costs in various geographic areas of the country. In the family, the costs are frequently estimated on a 1-2-3 basis, where one unit represents the dependent children's cost; two units, the male employee; and three units, the employee's wife.

The *second* consideration — and the chief subject of this presentation — is cost control of Major Medical Expense Insurance, with its relationship to improper use by those insured and by the medical and allied professions.

The continued success of Major Medical Expense Insurance depends on cooperation from five distinct segments of the American public: (1) the physician, (2) the hospital, (3) the insured, (4) the insurance company, and (5) in the case of Group Major Medical Expense, the employer.

(1) *The physician.* Physicians have many reasons for being interested in the success of Voluntary Health Insurance.

According to The Health Insurance Council issue of August 1956, the 1955 benefits payable by type of benefit and by type of insuring organization were distributed according to the following table.

Type of Benefit	Type of Insuring Organization			
	Insurance Companies	Blue Cross-Blue Shield	Indep. Plans	Total
	(millions of dollars)			
Hospital Expense ..	$ 745	$ 870	$ 75	$1,690
Surgical and Medical Expense	445	340	55	840
Loss-of-Income ...	595	—	—	595
Total	$1,785	$1,210	$130	$3,125

We all know the political as well as the sociological importance of the problems of financing the costs of medical care. Both of our major political parties recently have focused much attention on Major Medical Expense or catastrophic illness insurance. The Eisenhower administration has twice unsuccessfully introduced bills to provide a government-sponsored reinsurance plan to expand such coverages. In outlining his "New America" health program, Mr. Adlai Stevenson recently favored a program to make

comprehensive private health insurance available on a voluntary basis to all Americans.

Dr. Norvin C. Kiefer, Chief Medical Director of the Equitable Life Assurance Society, recently told a "Symposium on Medical Education and Industry" sponsored by the National Fund for Medical Education, that the physician "must learn that industrial and other voluntary health programs, although they may force him into some alteration of the conduct of his practice, nevertheless are based on an ideology of private enterprise and therefore are fundamentally sympathetic to his own desire to protect the private practice of medicine."

He continued, "These programs need the physician's understanding, active participation and full cooperation. If he fails to give such support, the result will be a weakening of such programs to a point where they no longer can satisfy public demand. Can we assume other than that from the resultant prostrated private health system, will emerge a mighty governmental health program?"

"If our private system fails," he asked, "what other answer could there be from a maturing democracy?"

(2) *The hospital.* Today, modern hospital service is an important part of the nation's standard of living. The remarkable development of hospitals and other health facilities over the last 50 years has been an important factor in the nation's improved health.

Ray E. Brown, immediate past president of the American Hospital Association, recently discussed the problem of rising hospital costs and described how it is inevitably going to get worse. Writing in "Hospitals," the official publication of the AHA, he said: "Unless there is a very significant decrease in the general economic situation, we must expect hospital costs to continue to increase at about five per cent annually for many years. Only by the best efforts of hospital boards, administrators, medical staffs and all members of the hospital team can costs be held within that level of increase." He pointed out that for the nine year period, 1946 through 1954, total costs of

short term, general hospitals increased $12.37 per patient day. Of this increase $8.23 was in payroll alone. While the total costs per patient day were thus rising by a factor of 132 per cent, the payroll costs per patient day were rising at the rate of 165 per cent.

One area for future improvements in which hospitals are actively working is improved and more uniform accounting methods. Obviously, if hospitals, particularly small ones, are better able to control their costs, insurance companies will be better able to control premiums on hospital insurance.

(3) *The insured.* The insured's cooperation is needed to prevent abuses. When insurance benefits are paid for needless work absences, or when the insured demands insurance benefits for unnecessary or overlong hospital stays, unneeded medical service, or health luxuries generally, the effect is to increase the costs of the insurance without any corresponding increase in its true value to the individual. While the majority of the insured do not abuse health insurance, it is hoped that the minority inclined to do so can be made to realize that they — as part of the public at large — are paying the bill.

(4) *The insurance company.* Insurance companies which sell Major Medical Expense Insurance have a great responsibility to the public. Actuaries and underwriters planned this insurance on a sound basis for the public benefit.

Benefits that are promised regardless of any similar coverage by another company encourage abuse. Not only can such duplication of coverage and the consequent duplication of benefits become a temptation to certain policyholders, but it may lead to indignation on the part of the physician who has charged a regular and customary fee, and then discovers that, as he says, "The patient is profiting at my expense."

Insurance companies have been criticized for giving insufficient attention to overutilization of medical facilities. It has been stated by some critics that we merely keep an eye on claims experience and adjust our premiums when

necessary to guarantee that expenses, whether justifiable or not, remain adequately covered. Is such criticism deserved? Perhaps so.

When a claim which seems to be excessive is presented to us, do we pay it without a complete study of its merits? Would not diplomatic contact and negotiations with the medical profession and hospital administrators be more effective? And is not the leadership in such endeavors a responsibility of medical directors of insurance companies?

When luxury benefits are paid, premium charges necessarily are raised, without any increase in the true value of the benefits offered. An insurance company would be remiss in its duty toward its policyholders if it insisted on increased premiums every year or so in order that luxury benefits would go to a few less conscientious policyholders. It would also be contrary to sound insurance principles if the insurance company did not do everything possible to study and curb, if necessary, any questionable practices tied in with Major Medical Expense Insurance whether it be by an agent, a policyholder, hospital or doctor.

(5) *The employer.* Industry in recent decades has contributed much to the development of health insurance and also has made great strides in company programs for improved health of employees.

Employers have adopted improved safety practices, have provided healthier working conditions, reduced occupational diseases, and in many instances have established well equipped and competently staffed medical departments which provide preemployment and preplacement examinations, periodic health examinations and emergency treatment for employees.

Concerning the prevention of abuse of Group Major Medical Expense Insurance, employers occupy a particularly strategic position. Their medical directors, whether employed on a full time or part time basis, can often be helpful in distinguishing between the bona fide claim and the luxury, exaggerated or dishonest claim for benefits. It is decidedly to the employer's advantage to cooperate

in preventing the payment of excessive and unjustifiable benefits. The net premiums on Group Health Insurance policies paid to insurance companies are closely proportionate to the benefits paid. Thus, the employer in helping to prevent excessive benefit payments not only contributes to the success of his Major Medical Expense Insurance plan but also reduces its net premium cost.

Now let us return to the problem of excessive charges, the need for cooperation of the medical profession, and what we, as insurance company medical directors, can do to help solve it.

The insurance industry knows that medical costs must be kept within reasonable bounds. Organized medicine recognizes the danger of allowing these costs to get out of control. What is needed is a more effective method of channeling information from insurance companies to individual members of the medical profession. Here is a fertile field for medical directors. *As medical directors we must take cognizance of anything that threatens the success of our Voluntary Health Insurance system.* Medical directors in all companies engaged in the accident and health field should periodically visit medical societies to solicit and encourage support of the medical profession.

Many articles, pamphlets and addresses on Voluntary Health Insurance have been prepared — chiefly by laymen. In the main, they have been good; some have been critical of insurance companies, some of practising physicians, and some of patients who demand services and benefits which are in the luxury class. *But thus far we have failed to get across to enough American physicians the story of the existence and effects of unnecessary charges, even flagrant abuses, that have risen in the field of Voluntary Health Insurance.*

Whatever criticism is implied here is offered constructively and for the future good of both Voluntary Health Insurance and the medical profession. Certainly it is not directed at the vast majority of physicians and surgeons who practice ethical medicine and render their usual and customary fees regardless of whether or not their patients have insurance. Rather, it is designed to solicit serious consideration by a minority of the medical profession who

apparently do not understand the motives or problems of Voluntary Health Insurance and the crucial importance of their cooperation to the success of the voluntary health system.

The fact that the maximum benefit in a Major Medical Expense Insurance policy runs from $2,500 to $10,000 provides an unusual range of charges that the insured may be able to pay. The high ceiling on charges opens the door not only to overcharges by physicians, particularly surgeons, but also to overutilization of hospital and nursing facilities, unjustifiably expensive treatments, and unnecessary diagnostic procedures. In Major Medical Expense Insurance the deductible and coinsurance provisions alone cannot control such charges.

Some insurance companies, including the Equitable Life Assurance Society, are now issuing a comprehensive health care policy which combines the basic plan along with major medical features. This demands even more attention from medical directors of companies selling such a policy and greater understanding and cooperation on the part of practising physicians.

Abuse of any insurance plan occurs when there is excessive or injudicious use of the services of a physician, nurse, or hospital, unnecessary laboratory tests, x-rays, electrocardiograms, and expensive drugs, as well as continuation of disability sick benefits once the patient can return to work. There are certain factors, however, that have a legitimate effect on the amount of the medical or surgical fee. Among these are:

(1) The claimant's financial or executive position.

(2) The professional standing of the attending physician or surgeon.

(3) The extent of the surgical and medical service provided, including any unusual problems or serious complications that may have been encountered.

In Major Medical Expense Insurance, where these factors are involved separately or in combination so as to create unusual circumstances, special consideration should be given to a physician's or surgeon's charge. It cannot be overemphasized that careful attention must be given to each individual claim. Keeping in mind the provision that "charges shall in no event include any

amount in excess of the regular and customary charges for the services, supplies and treatment furnished," unusual and extenuating circumstances also must be recorded and carefully evaluated.

There are two chief categories of high medical and related fees encountered in Major Medical Expense Insurance claims:

(1) Those in which the fee is distinctly higher than expected. These are the most readily detected, easily investigated, and effectively contested.

(2) Those in which the fee is only a little higher than expected. This category has been aptly called "creeping costs." Recognition of their existence is likely to be tardy, investigation is difficult, and effective countermeasures must be based on accumulation of a large number of cases and depend on long range educational efforts.

In the long run, the second category, if unchecked, probably will do more damage to Major Medical Expense Insurance. The first category, however, offers more immediate prospects for corrective measures.

A fee is considered to be excessive when it is unreasonable in relation to the factors previously mentioned. The following are a few illustrations of such actual cases that have been received and come to my personal attention during the past two years.

Case 1. The claimant's annual income was approximately $2,500; a lobectomy was performed; surgical fee was $2,500.

Case 2. Estimated monthly income of the claimant was approximately $250; a gastrectomy was done; the surgeon charged $1,500.

Case 3. Monthly income of the claimant was estimated at $500; dilatation, curettage, and cauterization of cervix were done; surgical fee was over $1,200.

Case 4. Annual salary of the patient was approximately $4,000; a semilunar cartilage of the knee was excised; physician's fee was over $1,000.

Case 5. Estimated monthly income was $1,000. The diagnosis was *questionable* angina pectoris, the patient being hospitalized three weeks. Two medical fees amounted to over $1,200, while total expenses were over $2,100.

Case 6. Occupation of claimant was that of common laborer. The operations consisted of amputation of one arm and setting a fracture of the other arm. The surgeon's charge was $2,500, and total expenses amounted to over $4,000.

The following are cases in which fees were unusual, but in view of the fact that the patients were either executives and/or in a high financial bracket, they were approved.

Case 1. A total hysterectomy was performed; surgical fee was $5,000, and total expenses were over $8,000.

Case 2. Suprapubic prostatectomy and bilateral vas ligation were done; surgical fee was $2,500, and total expenses were over $3,800.

Case 3. A diagnosis of cerebral thrombosis was made. The fees of three physicians totaled over $2,700, and all expenses amounted to over $4,700.

Case 4. A submucous resection was performed for which the surgeon charged over $1,800. Total expenses were over $2,800.

The medical department of an insurance company has a great responsibility in a field so intimately connected with medical care. A proper approach by a medical director promotes better understanding from members of the medical profession, and personal contact by either telephone or correspondence should be handled by a medical director if the company wishes to obtain full information from the attending physician or surgeon, substantiate its consequent medical action, and provide the clinician or surgeon with an explanation of the action.

The Equitable Life Assurance Society has been active since 1911 in the growth and development of Group Insurance. It was the first life insurance company to announce a Major Medical Expense policy for individuals and families in August 1951.

Almost three years ago a new activity was initiated by its Medical Department. This led to the establishment of the Industrial Health Service, the chief objectives of which are to establish good medical public relations with Equitable Group policyholders by assisting them professionally in matters relative to Claims Experience and Industrial Medicine, and to act as medical con-

sultant for the Equitable in the field of Voluntary Health Insurance.

Efforts to combat abuses of basic coverages, as well as of Major Medical Expense Insurance, are among the functions of this new Service. It is located in the Medical Department under direct supervision of the Chief Medical Director in order to preserve its medical identity and to assure full use of all Medical Department facilities and skills. It is closely related to the work of many other departments but especially of the Group, Claims, Underwriting, and Legal Departments.

When requested by the Claims Analysis Service of the Group Department, visits are made to Group policyholders in cases of unsatisfactory claims experience with their Group Hospital, Accident and Health, and Major Medical Expense Insurance plans. These trips are designed to help solve the problems and to create a more favorable relationship among the Group policyholder, local physicians, and the insurance company, on a high medical executive level.

Talks on health insurance are given at medical societies and hospital staff meetings. Doctors are interviewed personally on questionable claim matters. They are contacted in person, by telephone or by letter on matters pertaining to health insurance, including, of course, unusual fees. It has been found that a tactful approach by an insurance company medical director, talking as physician to fellow physician, is more likely to enlist cooperation from the attending physician than is an approach, no matter how careful, by a nonmedical representative of the company.

The results of addressing medical societies are impressive. Confidence is enlisted by pointing out that competence in clinical medicine is essential to competence in insurance medicine, and that many of us have had considerable experience in both fields. Recognition that the speaker is truly a fellow physician who is first of all interested in preservation of our system of private practice of medicine, results in a friendly and cooperative attitude on the part of the physician audience.

Some basic insurance facts and the meaning of health insurance are described. Specific examples of where the insurance industry

and the doctors can and should cooperate are pointed out. Major Medical Expense Insurance with its distinct features and potential abuses are reviewed. The question and answer period following the talk has always proved to be stimulating and interesting. The atmosphere of these meetings is anything but hostile; an exchange of views occurs in a setting of dignity, respect and courtesy.

From personal experience over the past three years there is reason to believe that the physician in practice is interested in insurance, particularly that part involved in medical care. He soon realizes that insurance payments form a substantial part of his income and he is quite willing to give it the thought and attention it rightfully deserves.

Attendance at these meetings usually is the result of an invitation from either the President or Secretary of the County Medical Society. Meetings are scheduled months in advance and are properly advertised to the membership.

In presenting my talk to physicians, it is stressed that all forms of Voluntary Insurance, including Blue Cross and Blue Shield, are being considered. At first, some physicians may show an unsympathetic attitude toward insurance in general and express their belief that the insurance industry is trying to regiment medicine. They are assured that the insurance industry is in no way interfering with the private practice of medicine. They are told that, by providing various forms of Voluntary Health Insurance, insurance company interests are indeed in sympathy with those of the medical profession, and that Voluntary Health Insurance plans are perhaps the last bulwark against a national medical and health care program.

I believe that these talks to local medical groups are of great value, but, unless many other insurance companies join in these efforts, the number of such medical groups that can be reached is severely limited.

Some possible recourses should be mentioned for use when an understanding with the physician cannot be reached concerning individual excessive charges. We know, of course, that the American Medical Association has encouraged use of the County Medical Society Grievance Committee. In my opinion, a direct approach

to the doctor always should be made first by a medical director of the insurance company.

Before presenting a claim to a County Society Grievance Committee, we must have the cooperation of the County Medical Society. Although these committees are sympathetic to a grievance from an individual, physicians frequently are less sympathetic toward insurance companies with their great assets appearing before a Grievance Committee as a third party. Furthermore, sympathy for the company may be discouraged by the attitude of the insured who has paid an insurance premium for his coverage and mistakenly feels that he is recouping money that is rightfully his regardless of the merits of his claim. Such cases are likely to result in bad publicity for the insurance company. In a group policy the employer has a financial interest and public position to be protected.

It is hoped that in the near future a more satisfactory mechanism can be developed between medical societies and insurance companies in order to evaluate cases in which fees seem unreasonable.

SUMMARY

The medical director has an important role in the successful operation of Major Medical Expense Insurance. It is his responsibility to see that the Claims Department has available at all times professional advice in order to avoid abuse and overutilization of any health plans. If he approves any unreasonable claim without thorough study of its individual merit, he is simply inviting more abuse.

The directive to the medical director therefore is quite clear. He has a useful function to perform from which he should not and cannot shirk. His cooperation is necessary to the underwriters, claim representatives, and agents for the insurance plan; to the physician in order that he may solicit his cooperation necessary to make voluntary health plans successful; to the employer to see that costs are kept within bounds; and to the insured to see that equity is provided.

Major Medical Expense Insurance is no longer in its infancy but is now experiencing growing pains. In spite of those pains,

its growth has been phenomenal. What is needed most at this time is intelligent understanding of and sympathetic consideration for the problems of both insurance companies and medicine. An intensive educational and public relations program directed toward better public understanding and full cooperation by physicians is necessary for Major Medical Expense Insurance to complete its objective.

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DR. FILSON — Our next and final speaker is a veteran, having had an active part in his company in the building and the administration of an ever-changing and broadening picture of Accident and Health insurance growth. This experience has now extended over some three and a half decades. Dr. Horan has contributed much in the affairs of this Association. I am sure that to all of us, and especially to those who are comparatively new as medical advisors, there will be much to gain in the way of practical guidance through hearing the paper by Dr. Joseph C. Horan, Associate Medical Director of the Metropolitan Life Insurance Company. Dr. Horan will speak to us on the subject of "Noncancellable and Guaranteed Renewable Insurance — Underwriting Considerations." It is my pleasure to introduce Dr. Horan.

NONCANCELLABLE AND GUARANTEED RENEWABLE INSURANCE — UNDERWRITING CONSIDERATIONS

JOSEPH C. HORAN, M. D.
Associate Medical Director,
Metropolitan Life Insurance Company

The previous speakers have given an integrated picture of health, accident and major medical insurance. Mr. P. C. Irwin stated that there is much yet to be done in expanding coverages and increasing benefits. He pointed out that all these efforts are being made to give the American people the best health care possible on a voluntary basis, thus avoiding the dangers of socialized medicine. This point needs no further emphasis. Mr. Joseph Follmann's excellent paper on major medical insurance analyzes this approach to broader coverage for the more expensive types of medical care. Dr. William McNamara's contribution concerning the role of the medical director in major medical insurance supplements and complements the paper of Mr. Follmann.

The remaining time will be given to discussion of another approach to meet the needs of the insuring public and this lies in the rather recent venture into the field of noncancellable and guaranteed renewable accident and sickness insurance. Contracts containing this very valuable concession can and are being written in both the individual and family hospitalization and surgical operation insurance, including the older age groups up to age 75 and, more importantly, to cover loss of income due to disability.

At the 62nd Annual Meeting of the Association of Life Insurance Medical Directors of America in 1953, a part of the *Transactions* was devoted to the subject of personal accident and health insurance. At that time the statement was made that in the previous sixty-one meetings of this group, accident and health insurance did not concern us enough to ever before devote a part of the annual meeting to that type of coverage. Because of the very rapid growth of this business and because of the large number of our member companies having entered the field within the

previous five years, discussions pertaining to this subject were made a part of that program. The prediction was made then that 50 per cent of the companies in the Association would be in the accident and health business by the end of 1954. This prediction was wrong on two counts. It missed by one year and by one company the exact year and the exact total. It was not until the end of 1955 that of the 214 life insurance member companies, 106, and not 107, were writing some type of accident and health coverage on individuals, families and employee groups.

For many, if not for most of our companies, accident and health insurance was a new horizon. During the last half of the nineteenth century and the first half of the twentieth, most of our member companies were devoting themselves exclusively to the insuring of life. With a few exceptions, the entry into the accident and health business did not rapidly accelerate until about 1948. But the comparatively recent years have witnessed what might almost be described as a headlong scamper on the part of life insurance companies to enter this business. Therefore, most companies were without any experience whatsoever in a field that had been almost exclusively occupied before that time by accident and health and casualty companies.

Many people may tend to think of health insurance as being mainly insurance against hospital, surgical, and other bills for the treatment of ill health. But protection for the family breadwinner against loss of earning capacity can often be of greater importance. In cases where sickness or accident causes loss of income, the amounts involved are frequently much more than the hospital and doctor bills alone.

At the end of 1955, an unduplicated total of 39,444,000 workers had loss of income protection. This does not include, however, the millions of employees who have some measure of loss of income protection through informal wage continuation practices of their employers. Insurance companies are active in providing loss of income protection on both a group and an individual policy basis, covering 30,344,000 of the above total. Blue Cross-Blue Shield, however, do not offer loss of income protection.

In the face of figures given us by Mr. Irwin and the fact that

more than 30,000,000 people are covered for income replacement, it would be trite to discuss whether or not the insurance industry is attempting to fill the public need for prepayment medical care and disability. The insuring public feels, obviously, that it requires and can afford to pay for such protection under our American system of individual private enterprise. We in the life insurance business are now providing ample opportunity for our policyholders to add this necessary supplementary insurance to round out their ring of protection against the financial losses due to accident and sickness and the high costs of medical care.

By tradition and training and our upbringing in the insurance discipline, we would have preferred to see this new type of business — hospital, surgical and medical as well as income replacement — in which most of the life insurance companies were novices, become seasoned and grow to orderly maturity in the same manner as did our life business. With methodical sales eventually giving us a wide spread of risk and the acquiring of a statistically matured experience, the company actuaries could then have recommended liberalizations and removals of restrictions and exclusions as they became warranted. We were, however, denied this opportunity by the very rapid growth of the accident and health business within the last decade. During this swift growth public and governmental agencies began to interest themselves in the problems which are inherent in this highly specialized business. Syndicated newspaper articles and monthly periodicals, as well as state legislatures and various agencies of the federal government, became very vocal in their criticisms of the sins of omission and commission which a few of the accident and health, casualty and some life companies had allowed to creep into their operations. It is hardly explanation enough to point out that this young giant has achieved its gargantuan dimensions so recently that it is still subject to the adolescent growing pains attributable to its being still in the sometimes frustrating throes of puberty. These criticisms are not completely minimized by our pointing out that the offending companies were few in number and constitute a very small percentage of the total. This is particularly true in the face of the emphasis that the public agencies and lay press have placed on the refusal of companies to renew contracts principally because of deterioration in physical condition. You are all familiar with

these criticisms and the National Association of Insurance Commissioners are particularly conscious of them. At their meeting in June 1955 at Los Angeles, they formed a subcommittee to study the problems incident to cancellation and to clearly define issues and ramifications to the end that any existing inequities might be alleviated to the mutual benefit of the insuring public, the industry and the regulatory agencies concerned. An interval report was issued in April 1956 that dealt principally with the generic term "cancellable" as it had come into common usage. This was defined as the reservation of the right by the insurance companies in the policy contract not only to cancel a policy at any time upon at least five days notice and return of the unearned portion of the premium, but also to refuse to renew the policy on a premium date. The Subcommittee's study indicated that 90.6 per cent of all accident and health insurance purchased by individuals was on a cancellable basis. Despite the fact that the right of the company to discontinue any policy of insurance is not unfamiliar to the public, this Subcommittee raised the question as to whether or not all individual accident and health insurance coverage should guarantee to the insured that his protection would be continued at his own option for as long as he desired it, or at least up to some stated ultimate age.

This study on cancellable accident and health insurance was very complete and exhaustive. In their early deliberations the Subcommittee recognized that the historical dominance of terminable forms of this type of insurance, because of its very nature, reveals that the acceptance of such forms by both carrier and insured has been a reasonable development. They point out that, as medical men know, human health is a very complicated matter. There are people who are fairly well and those who are unquestionably sick, but there remains many who are not definitely either one or the other. Even diagnosis is not always crystal clear and among several persons in this gray area, the subjective attitude toward symptoms is variable. One shrugs off the symptoms and goes to work as usual. Another takes to his bed. A third may make an emergency call to his doctor, while a fourth demands immediate hospitalization. At the time the Underwriter is dealing with an applicant, he may have reasonable assurance

as to the moral character and reputation and presume that his future claims will be reasonable and just. However, this initial evaluation does not suffice because when that applicant gets sick, what he may do about working or not working becomes unpredictable. From a claim viewpoint, many other unknowns then enter the picture. In general, for those who are insured, the trend is toward higher frequency and severity of disability. Some such insured policyholders have acquired a financial ability to stop work which they did not have before they insured against these losses. The progress in the science of therapy enters into the picture also. Durations of many disabilities may be shortened by improved medical technics, but on the other hand the great improvements in mortality have permitted more people to survive to ages when disability becomes more frequent and more prolonged. The sad experience of the 1930's shows that morbidity rates were more than twice as high when the depressed economy provided little inducement to terminate disability and to return to work or to resist borderline disability. For all these reasons the cancellable contract was one solution to the problem and the company's right to decline renewal to any individual permitted it to retain those risks who continued to meet the underwriting standards, and by eliminating those risks who produced a disproportionate amount of claims, the company could continue to renew the coverage for most of its policyholders at the same low premium rate for as long as their aggregate experience warranted.

The Subcommittee studied the reasons for cancellation. The principal ones included discovery of misrepresentation or fraud, false, exaggerated or excessive claims, moral hazard subsequently developed or undetected at the initial underwriting or evident in the claim experience, overinsurance, and discovery of undisclosed preexisting medical history. Other causes were deterioration of health below the underwriting standards of the company, changes in occupation where the occupational hazard is materially affected, attainment of the age limits for which the policy is rated, and full payment of benefits promised, leaving the insured ineligible for further benefits.

After an industry committee had been invited as advisors to the Commissioners' Subcommittee, they recommended continuing

augmented voluntary efforts to meet the problems within the industry itself without additional statutory or administrative enactments. The Commissioners' Subcommittee, however, felt that there was need for more immediate and decisive action to satisfy the principal cause of policyholders complaints and the reasons least understood by the insuring public which had to do with cancellation because of deterioration of health. Their final report, which was adopted by the parent committee and the National Association itself, last summer, recommended:

(1) That in all cases the period of notice prior to cancellation be increased from 5 to 30 days.

(2) That the guaranteed term of all accident and health policies be made not less than one year regardless of the frequency of premium payment.

(3) That the cancellation provision (as distinguished from the right to refuse renewal) be eliminated entirely. This would prohibit cancellation of the policy during the period for which premiums are paid. In general, few companies, and probably no life companies, are currently using the cancellation provision, relying entirely on the right to refuse renewal.

Other recommendations concerned themselves with the admonition that companies voluntarily make a sincere effort to refrain from refusal to renew solely because of deterioration of health.

An attempt has been made in what has just been said to give you a complete and at the same time a succinct evaluation of the recommendations of the National Association of Insurance Commissioners, realizing that it has used up a part of the time assigned to the subject of this paper. The reason for this is that your own Executives are aware of this report and they may ask for your views concerning what your own company should do in their approach to the noncancellable and guaranteed renewable questions.

One rather persuasive argument in favor of a noncancellable type of coverage runs somewhat as follows: "When I apply for life insurance it is because the loss to be insured against — my death — is a loss I can anticipate will surely happen and I want to pay premiums to meet that eventuality. When I apply for

health insurance, the loss to be insured against is sickness, i.e., deterioration of my physical condition. When that eventuality does happen, I do not want the coverage to be in jeopardy of cancellation by the insurer, else where is my insurable interest and why should I be paying premiums only during the time I am not incurring any loss. Or, put another way why, after the reason inducing me to buy protection — the hazard of a deterioration of my physical condition — has become an established eventuality, should the insurer have the right to cancel any further promise of protection when I need it most and have no chance to replace the coverage elsewhere?"

However specious the argument may be, it is indicative of a public need for coverage which cannot be cancelled by the insurer. Many of our companies have, therefore, entered into, or reentered, the noncancellable field. Some have gone into it exclusively and others have introduced it as an additional line. Some few accident and health companies have never stopped writing it at all.

The noncancellable type of insurance was first introduced in this country as long ago as 1907. That pioneering experiment was underwritten by the National Masonic Protective Association of Mansfield, Ohio. The first corporate carrier was the Massachusetts Accident Insurance Company which began writing guaranteed renewable contracts in 1915. With the huge losses which occurred during the depression, nearly all of the companies in that field were forced to stop the issuance of this type of coverage because the old policies paid lifetime sickness benefits.

The new noncancellable and guaranteed renewable policies now being written for loss of income protection limit the losses by restricting sickness benefits to a specified number of years instead of the old lifetime sickness benefits which proved catastrophic during the depression. The premiums charged are higher and the hope is they will prove to be adequate. These guaranteed renewable disability income policies carry with them a guarantee that they will be renewable at the same premium rate. In other words, the premium itself is guaranteed for the duration of the policy. This is not necessarily true of the noncancellable and guaranteed renewable hospital and surgical policies. The premium at the same rate is specified there with a proviso that if the ex-

perience in the entire class indicates the need for it, the premium rates at some future date be increased on all policyholders falling within that classification.

When we come to the underwriting considerations for long term noncancellable and guaranteed renewable disability, we all agree that the requirements must be more rigid than those used for underwriting of cancellable forms. The Medical Underwriter must try to forecast what type of impairments or adverse past medical histories carry with them an implication of future deterioration of physical condition. In these newer so-called noncancellable and guaranteed renewable forms of coverage, wherein the right of periodic reselection is forfeited, the initial classification of the risk is the only one which will be afforded to the company. The old accusation that a company may be doing its underwriting in its Claim Division is a criticism which none of us ever liked and a technic against which any company entering this new business will be hereafter automatically foreclosed.

The causes of long disabilities are fairly well known to us from our experience and, of course, we do not want to grant this type of coverage to applicants with serious organic disease of the cardiovascular or renal systems. We can declare as uninsurable at the time of underwriting, diseases of the brain and spinal cord, the chronic arthritides, cases with histories of malignancy, chronic tuberculosis, bronchiectasis, emphysema and severe asthma. These, and many other similar impairments, cannot be given favorable consideration for this type of insurance. The difficulty at the time of underwriting for the Medical Underwriter will come from those impairments and adverse medical histories which are much more borderline. In an attempt to be practical, we have reviewed our actual underwriting of applications for noncancellable and guaranteed renewable in accident and health insurance and find that the principal medical reasons for not issuing were in a descending order of frequency about as follows: the serious organic diseases cited above, plus peptic ulcer, hypertension, visual impairments, mild psychoses, low back impairments (principally disks), overweight, leg or foot impairments, histories of kidney disease or stones, and arthritis.

To get a sharply focused accurate photograph of an applicant

for long term guaranteed renewable accident and health insurance, we cannot depend on the somewhat indistinct snapshots such as have served in the past for policies which had limited liabilities by reason of the fact that they were nonrenewable and even cancellable. To obtain this sharply focused portrait of the applicant, it will now be necessary to use a tripod. The underwriting tripod has its first and very important leg in its Field Underwriter. A proper field training program to teach him the essential elements of selection for this type of risk is essential. He should learn the importance of correct, complete and comprehensive answers to the questions in the application. The applicant himself cannot be expected to know the underwriting significance of his own past medical history, nor can he give a proper valuation to impairments previously disclosed to him by his physician. The well trained agent can bring out the facts when he is completing the application. One of the most important criteria in the acceptance of an applicant for this more generous coverage depends on the applicant's character and reputation. Only the well trained local agent can do this part of the underwriting adequately. He must be taught how to appraise this fairly intangible characteristic of moral hazard and such underwriting ability should supersede his eagerness to demonstrate to his company his expertness in salesmanship. Satisfactory results and the success of the insurer are closely related to the quality of the company's agency operations and the adequacy of its Field Underwriters.

The second leg of the tripod is the lay underwriting as practiced in the Home Office. Teams of junior lay underwriters can handle all the simple cases referring only those beyond their ability and authority to the senior lay underwriter, who supervises their work, for his final decision.

The Underwriting Division has, in addition to the application and agent's report, other tools to aid in its decision. Inspection reports will provide information about the exact duties of the occupation, the amount of the earnings, the personal habits and reputation. Statements from attending physicians are valuable aids on the past health history. Whenever indicated requests for reports from company Examiners should be initiated and in some

cases, especially in older applicants seeking this very generous coverage, these are absolutely essential.

Where the underwriting rules require reference to the Medical Underwriter, and very many of these applications should require the use of this third leg of the tripod, all of the specialized knowledge and experience of the Medical Director doing this work must enter into the final decision. As the Medical Underwriter, he then has several courses of action. He may recommend acceptance, taking a calculated risk that this applicant and the others in the group into which the given applicant falls because of past medical history and physical impairments will show in the aggregate about the same disability probability as the normal group upon which the premium rates were predicated. If the evaluation of the risk places the applicant so far outside any such favorable prognosis, one may recommend declination altogether. In between these two extremes there remains considerable latitude. For acute impairments from which full recovery may be expected appropriate action would be to postpone acceptance. Other factors of adverse past medical history or physical findings can in many instances be insured with a properly worded exclusion endorsement, with or without a time factor, for future review. Other underwriting considerations related to limitations of over-all dollar amounts or prolongation of the waiting periods may be utilized.

In making the transition from the underwriting of standard to noncancellable and guaranteed renewable the Medical Underwriter is of necessity the one who controls this experimental enterprise. Thus it is that the Medical Director doing this work must learn to make wise and equitable decisions. If he is overconservative in his prognoses and thereby runs up a very high rejection rate he may derive comfort in having done a fine job of medical underwriting, but eventually there will not be enough premium income with which to pay his salary. Furthermore, his company will not accomplish the purpose for which they embarked on the new business because of his ultraconservatism. His company will be placed in the position of having offered very attractive policies which, as a practical measure, will be very hard or impossible for the public to obtain because of excessively high medical hurdles. One of the deterents to the generous use of fairly comprehensive

exclusion endorsements under the standard forms was the philosophy that too many rider restrictions on these limited policies result in issuing too restrictive a coverage and accepting too much unearned premium. These new forms of contracts are so much more valuable because of their long term coverage which cannot be cancelled and which must be renewed that the more ample use of exclusion endorsements can be justified because of this very fact alone. Utilization of exclusion endorsements for the more serious impairments and fewer of them under the limited standard forms will give the Medical Underwriter more latitude in his underwriting.

If this philosophy can be accepted, underwriters may want to give consideration in setting up their underwriting rules for use of exclusion endorsements in the borderline group for impairments which have produced symptoms resulting in a diagnosis of arthritis, asthma, cataracts, detached retina, diverticulosis, emphysema, gastric and duodenal ulcers, ileitis, kidney stones, osteomyelitis, pyelitis, thyroid disease, and many other conditions in which there has been a reasonable interval of time since cessation of symptoms — the risk being otherwise first class.

In formulating medical underwriting rules, advantage should be taken of any technic which will avoid a high rejection rate and at the same time include with proper exclusion endorsements as many applicants as can safely be underwritten.

To be a really practical contribution this portion of the program should be concluded with the distribution of a "Guide" for the investigation and rating of medical impairments pertaining to the underwriting of noncancellable and guaranteed renewable accident and health insurance. We are sorry no "Guide" exists and if there were one it would be a sham without authenticity. This is for the obvious reason that any such "Guide" should be premised on claim experience and this field is so new that no representative or dependable experience has yet been accumulated.

The theme for this symposium was set by the first speaker who stressed the public need for expanding coverages. Major medical insurance is one way of meeting the needs of the public. Noncancellable and guaranteed renewable disability as well as hospital

and surgical will satisfy another demand. Some accident and health and life companies have entered the truly substandard accident and health field and through the mechanism of a rated up premium they try to anticipate and cover losses due to the very impairment which makes the applicant substandard. We will watch with interest the experience which develops in those companies because they are undertaking a further effort to fill a public demand and need.

Two other approaches need only to be mentioned. My company is attempting to cover the older age groups up to age 75 with a noncancellable and guaranteed renewable hospitalization and surgical operation benefit policy. This is being offered to counter the criticism that when the need for hospitalization and surgical operation insurance becomes greater because of advancing years and when the individual's group coverages cease by reason of semi-activity or actual retirement, there has not been any way to replace this needed coverage. These policies may include the spouse and dependent children. An alternate method of expanding coverage is being tried by some companies writing group insurance. A contractual privilege of converting the hospital and surgical coverage to an individual or family hospital and surgical policy on a nonmedical basis, with the payment of appropriate premiums, is being offered in some group plans. This conversion privilege may be utilized on the retirement of the insured employee or for the continuation of coverage at his death on his widow and dependent children. Some personal family hospital and surgical plans also now contain a similar conversion privilege. There has been a demand also for an opportunity to obtain hospital and surgical coverage which would provide a lifetime benefit for an individual or eligible dependents which would be marked "Paid-Up" when both the husband and wife have reached age 65. By contribution of some additional premium during the productive years, we are issuing this type of hospital and surgical operation insurance which continues in force after the termination of the premium paying period.

To conclude the underwriting considerations as applicable to noncancellable and guaranteed renewable accident and sickness insurance, we have premised our remarks on the use of exclusion

endorsements as this is the accepted underwriting technic presently being employed by most companies engaged in this business. A good case can be made for the use of exclusion riders because the applicant is better off to be insured against all causes of disability other than the excluded one, than to have to forego insurance altogether. The use of this technic represents the only practical way available presently for handling certain conditions which might be correctable or disabling for a short time or subject to recurrences. As experience accumulates in those companies using exclusion endorsements, perhaps underwriting rules can be modified because no one likes to issue policies with limitations. It can be presumed that the few companies that have entered the substandard field were motivated by their dislike for exclusion endorsements and the hope that a practical numerical rating table calling for extra premiums to cover the additional hazard will prove to be a sound underwriting device.

DR. SIMMONS — Thank you, Dr. Horan. This concludes the formal papers and they are now open for discussion. The essayists will withhold discussion or answers to questions until all questions have been presented.

I am aware of the fact that there are guests in our meeting room this morning, some of them not physicians, and I wish to invite them to join in the discussion of these very important papers.

DR. DONALD G. KILGORE — I want to express my appreciation first for the comprehensive coverage we have had of this subject. I would like to endorse Dr. McNamara's remarks about the medical profession. My experience has been that they are eager to hear about insurance medicine and when properly presented I can assure you of their sympathetic attention.

I have been asked to speak briefly about the committee we have in Texas, a joint Accident Committee, composed of representatives from hospitals, the insurance industry, and physicians. When a member of one of these groups feels that he has a just complaint and has not been able to satisfy himself otherwise, he first gives this complaint to the appropriate screening committee. If he is a doctor it goes to the Medical Society; if he is a member of the hospital group, the hospitals have their associations; if he

is in the insurance group, the insurance industry has the Claims Association. These committees are composed of people who have had vast experience in settling disputes. They may dispose of this complaint by a simple suggestion to the man bringing the complaint. If they think it has merit, it is passed on up to the higher committee. This "Hip-Jack" Committee has no particular power except that of moral force but when these groups get together and lay all of the facts on the table, ordinarily most complaints are disposed of quickly and satisfactorily to everybody concerned.

DR. SIMMONS — Thank you, Dr. Kilgore.

DR. UNGERLEIDER — Dr. Simmons, I have been impressed, as most of you have been, by the quality of these papers. They have pointed out some of the ways in which the Medical Directors can and should participate in these programs. Now all of you are busy, and in making these contacts with the medical profession, a certain amount of research is necessary. This includes some amount of inquiry into what is being done in other companies, research of other publications, which may be difficult to procure. I want to call your attention to the publications of the Health Insurance Council. During the last years there have been five such publications and each of you should have received them. If not you may get them by writing to the Health Insurance Council. But the best thing the Health Insurance Council has done, in my opinion, during this year is the provision of a rather comprehensive speaker's kit. It consists of something like seventy or eighty pages. All the research has been done on the important points necessary to make a talk before any kind of medical society, and I would suggest that each of you write to the Health Insurance Council for a speaker's kit. By so doing, you will be able to address the county medical societies, as both Dr. McNamara and Mr. Follmann suggested. I believe that contact with the Medical Directors Association is desirable not only in the health insurance field but in all phases of our business.

DR. SIMMONS — Who else would like to speak on this important phase of our program?

DR. JOHN MCC. PECK — I just have a question. I would like to ask Dr. Horan if the lay underwriters have a manual available to them for their routine handling of applications.

DR. BERTHOLD T. D. SCHWARZ — It has been a very great pleasure to hear all of the fine papers throughout the meeting. I would like very much, however, to direct my two questions to the two medical speakers who participated in this symposium.

Dr. McNamara referred to the case of exorbitant medical costs of doctors' fees. Sometimes that is a very difficult proposition to determine what is unreasonable. For example, we have different social and economic strata in our population. Therefore, their requirements — the subjective requirements of the patients — vary. One might be satisfied with minimal medical attention and tests and perhaps his service bill might amount to $250.00. Another patient in another economic class might require all the tests he can get and his bill might come out tenfold greater. How are you going to evaluate what is reasonable and fair? Is it going to be a rule of thumb? Maybe Dr. McNamara would be able to help us.

Then, a question to Dr. Horan, I wonder how we might approach the exclusion rider proposition. That is a very fine thing, too, but take the example of arthritis — he mentioned that. Suppose a claim is submitted and the patient has an arthritis exclusion, but his diagnosis comes up from his doctor that he has sciatica, neuritis or recurrent lumbago.

DR. HALL SHANNON — I would like to ask Dr. Horan if they pay for services rendered to their policyholders by chiropractors and osteopaths. I do not know what the rest of your experience has been, but we have recently had several claims by chiropractors. Unfortunately, the law has been passed in Texas that their testimony in court has to be accepted.

DR. F. HARTLEY SMITH — It might be interesting at some stage in this to ask those who occupy some sort of official position with state or county medical associations to hold up their hands. I think a fair number of our doctors here already have some such association. I think it would be interesting to find out.

DR. SIMMONS — Suppose we have such a show of hands of those who have or have had positions in county or state medical societies. (There was a show of hands.) That is a wonderful showing.

DR. RICHARD B. SINGER — I have just one question to ask Mr. Follmann or anybody who can supply an answer. Do any of these major medical expense plans provide for psychiatric care?

DR. JOHN G. ROSS — It seems to me the fundamental thing in coverage for accidents, health and hospitalization is the desire of the public to have security against these hazards, which is creating the problem for us as insurers and ourselves as physicians as well. While the major medical expense coverage seems to be the best answer there is still a large segment of the population that is not covered, principally by reason of cost. I wondered whether the gentlemen who have spoken this morning might have some comments on that particular phase of it. How can we reach these people? I think in that way we can prevent the government stepping in and taking over if there is some answer to that problem.

DR. SIMMONS — Good question. Who else would like the floor?

DR. JOSEPH E. O'DONNELL — I have an opinion rather than a question. I think that a great deal of our expense on Health and Accident insurance comes from the patient who is seeking — and the doctor as well — a clinical work-up. The insured comes into the office with a pain and the doctor has to find out, and certainly the patient wants to find out. He takes recourse through his hospitalization to do that when the same procedure can be much more economically done as an outpatient. We are forcing a lot of people to go to the hospital for x-rays and simple procedures which normally could be done either in clinics or in offices or as outpatients. I come from a community of 35,000, and this is a very customary procedure there and it adds tremendously to the cost of hospitalization.

Now while I have the time to express an opinion, it seems to me that we ought to pay some attention to the federal method of handling equal complaints. If a client has stomach ache and goes to a Veterans Hospital and has a duodenal ulcer, he may lie in that hospital six or seven weeks. If he goes to Mayo Clinic he will be through and back home in four or five days — a matter of considerable economic difference.

And I have one further opinion to express: since I have been a Medical Director, I have been very much aware of the ten and fifteen per cent disabilities on people with normal physical examinations. I think that if our group could make themselves heard at the federal level it would do the taxpayers, themselves, and the profession a great deal of good.

DR. SIMMONS — Thank you for those comments. Does anyone else want the floor?

DR. MCSHANE — I would like to ask Mr. Follmann if it is within the realm of possibility that possibly catastrophic hospitalization insurance could be added to the hospitalization cost. In other words, if a per diem charge of 10 or 15 cents a day were added to the patient's hospitalization cost, could insurance companies then guarantee to pay over a certain amount — when the bill became a certain amount, to pay the balance beyond that?

MR. FOLLMANN — Dr. McNamara is going to answer the last one, even though it was directed to me.

There was a question raised as to whether major medical covers psychiatric care, and I think that might include such things as alcoholism. The answer is that the company practices differ. Some companies do not at the moment, some do wholly and some do in part. Obviously there is great temerity in approaching this coverage, but Mr. Donald Cody of the New York Life Insurance Company was recently quite emphatic in calling to the attention of the insurance industry that it was nonrealistic in the last analysis to attempt to leave mental care out of the equation of medical care.

The question was raised about the indigent and the low income group, and that might also include the temporarily unemployed. This is a problem with which we are greatly concerned. We at the moment within the industry are giving some consideration to a rather comprehensive research and educational program aimed at all of what might be considered the problem areas. The indigent, the low income group and the temporarily unemployed are three of the problem groups with which we are very much concerned.

One problem, of course, which faces us is the suggestion that government pay the proportion of the premium which the policy-

holder or prospective policyholder cannot afford to pay. That — and here I am expressing purely a personal opinion — is perhaps much oversimplified. I think when this subject is given some thought, it will be found that among other things the parties might be forced into a means test, which I think everyone, including those in government, finds unsavory. This is a problem which we are studying. It is not an easy problem to talk about insuring people who do not have money to pay the premium. On the other hand, they do have a problem of financing medical care, just as much as anyone else, and I think we have to recognize the fluidity of these various groups. We have to keep very much in mind, I believe, the low income person — and this is without definition — they can be made indigent by the fact of serious illness. Either the low income group or the indigent may be the older aged people, another group of the population with which we are concerned. The older age group may in turn be the chronically ill, and the chronic illness may produce the indigency, so while these population groups are often segmentized by those in government and out of government, they have a way of flowing into one another, making it a rather difficult problem to cope with.

A question was raised with respect to diagnosis and outpatient care and how we might encourage this rather than handling it through hospitalization, or the use of hospital care itself. I tried to point out in my paper that this is one of the hopes underlying major medical expense insurance. As we have written the segmented coverages in the past, there is no question that we have forced the use of expensive hospital care where it was not necessary. We are very conscious of this. We recognize fully that the medical profession is very critical of us because of this and this is what we are trying to overcome through major medical. Here we need the cooperation of the medical profession and again this is where you Medical Directors can play such a very important and valuable role.

The matter of Veterans Administration hospitals was referred to; and, of course, this is a subject with which we have been concerned, particularly when the insurance business is criticized for not paying claims because many policies exclude coverage in government hospitals.

In my paper I referred to the amount of government hospital care, and the fact that this care only covers some 25 per cent of the admissions to hospitals — the difference is in the length of stay — and that is why we cannot cope with it, as an insurance industry.

DR. HORAN — The question of Dr. Schwarz about the liberal use of exclusion riders. What do you do with them after you get them? I wish I knew. What we try to do is get an exclusion rider wording that says what we mean. We have a very forthright Chairman of the Board, who is a trained lawyer, and we have had it instilled in our indoctrination from the early days that if you are going to do something, say you are and put it in the contract; if you are not going to do it, take it out of the contract.

Well, I know, of course that when advising the Claim Division, these questions of the scrambled eggs are awfully hard to unscramble. Did the exclusion rider exclude that, and, if it did, will the law division defend you if we get into litigation? It is a very difficult problem. We do the best we can with it and try to be as liberal as we can in the interpretation of just what was excluded two, three or four years ago when we put the rider on, and see whether or not this current claim can be paid, if possible. Our slogan in the Claims Division is to pay every proper claim that we possibly can, and pay it promptly. That is not a very good answer, but it is the only one I have.

DR. SIMMONS — Dr. McNamara, I believe it is up to you now.

DR. MCNAMARA — I realize that the hour is late and I would just like to mention briefly a question or a statement by Dr. Schwarz on exorbitant fees. I do not like to use that term. It was expressed to me one day when I called a doctor on Park Avenue. He said, "Are you telling me my fee is exorbitant, Doctor?"

I said, "I have not used that word. I am sorry you got the wrong impression. But, your fee was $1500 and what we have in our surgical schedule is $150, so you have to admit it is a bit unusual." We do not have to use the word *exorbitant*, but it does require careful attention on the part of the doctor. Cases

I see are those referred by laymen when they are in doubt about the various things that I mentioned in my speech, the factors that have an effect on the amount of fee. They send me those cases, and I have made a careful study of them. I will not say how many I see but this is just part of my job as a consultant to the Claims Committee on such a situation. They ask me for my opinion: "Do you feel that this is usual and customary, or, in your opinion, what would be?" I think you doctors have to assume that responsibility. You probably are already doing it, but I am saying that we have to get closer cooperation between the Claims Department and our other departments on these claims. They are waiting for the doctors to come through and express their opinion, but when you call a doctor or write him, be very careful and tactful and do not accuse him of dishonesty or using exorbitant fees or excessive fees. After all, I think myself that the physicians have been blamed too much. I do not think we have educated the public. They are the ones that have bought these policies, whether individual or group, and, if they are abusing it, do not blame the doctors. What we should do is just approach the doctors and ask for more details. Tell them it is a question of a major medical and that with further details we can submit our report to the Claims Committee, and they are perfectly satisfied.

I have yet to meet a doctor, except the first one I mentioned, who used the word *exorbitant*, who questioned my motives any time I have written or called up. You would be surprised at the courtesy you get from the profession.

The next two I am going to combine, and it will be short. May I ask whether there is a company that writes such a policy as the gentleman mentioned, adding 10 cents a day for catastrophic medical? I imagine it could be written but I will have to ask my actuaries. I think the best advice would be to suggest to groups that they increase their basic plans to include this.

Recently, Mr. Hines, Vice President of Equitable said: "The essence of major medical insurance applies to all costs over which there is any practical control, with as few exclusions and limitations as possible. By and large hospitals are crowded. Hospital costs continue to rise, but not because of empty beds.

The desperately sick sometimes wait for beds to be vacated by sniffles cases. Hospitals themselves are interested in a shift from inpatient to outpatient care."

That is what we try to stress when visiting group policyholders — that these plans are not supposed to cover diagnostic procedures. The doctor has to diagnose the case to get the patient in but if the contract does not include the group laboratory and x-ray on the hospitalization plan, persuade the doctor not to put everybody in the hospital and thereby run up the bill.

DR. HORAN — I did not take the extra time to try to answer the chiropractor and osteopath question. The chiropractors and osteopaths are licensed in most of the states. Only two or three exclude the chiropractors, including New York State. If within the Medical Practice Act of the state in which they are practicing they are licensed as chiropractors, that is a limited license within the Medical Practice Act. If any of our policies provide a benefit for something that they are permitted by law to do, we recognize it and pay it. Now I do not believe faith healers are in the Medical Practice Act, but we also will accept from a Christian Science practitioner a statement of the belief that his patient had had something, which, if he were not a Christian Scientist, would have been called a cold or acute appendicitis. We will accept that report as not due proof of claim, because, after all, the claim is paid for a specific insurance loss, total disability, surgical operation, or something. We will use our other facilities that we have for investigation of claims and perhaps have a medical examiner call on that policyholder and complete the medical examiner's report. After all, you must all have some chiropractors as policyholders, and certainly you all have osteopaths, and also Christian Science practitioners or other people who follow those faiths when there is faith healing involved. If you use the limitations imposed by the state itself which permits them to practice freely within those limitations, and you have a benefit that you can pay for it, you can recognize them. You always have your own independent medical examiner's investigation as to the possibility of verifying the proof and making it due proof.

DR. SIMMONS — I cannot relinquish the office of President without feeling the great honor and the expression of friendship

and trust characterizing this office. I keenly appreciate your expression of confidence and particularly your cooperation in making this meeting a success. I would be remiss if I should fail to publicly express my great appreciation to certain persons and certain groups for their special help in the activities of the past few days. I am sure that it is the opinion and thought of this meeting that Dr. Reynold C. Voss, Medical Director of the Pan American Life, has gone beyond his required duties as a member of the Convention Committee.

I do want to express my appreciation to the entire Convention Committee, headed by our Secretary, Dr. Henry B. Kirkland, and whose third member is Dr. Frank McGurl.

Additionally I would mention with appreciation the work of our Program Committee, headed by my colleague, Dr. William O. Purdy, and associated with him Dr. Norman J. Barker and the moderator of the symposium, Dr. Ralph Filson.

Additionally I want to mention the Ladies' Committee. This is important since we have about half as many ladies as we have men at this meeting. This Committee was composed of the following: Mrs. Henry B. Kirkland, Mrs. Frank J. McGurl, Mrs. William Purdy, Mrs. Reynold C. Voss, Mrs. John Boland, Mrs. Duncan T. McEwan and Mrs. Norman Barker. I think my wife very ably assisted us in the program by acting as Chairlady of that Committee.

I think we should also recognize the tremendous amount of work that has been done by our Secretary, Dr. Harry Kirkland, and also Miss Clara Rizzolo, who has served at the desk, along with two very able assistants from the Pan American Life Insurance Company.

I am informed that there have been more than 200 men registered at this meeting and nearly 100 women. I think historically it might be of interest to you to know that when we first discussed bringing the convention to New Orleans, I had some reservations in my mind as to what that might do to our attendance, and I called first some of my colleagues in Canada, and I got nothing but warm approval of the idea — I think because they saw a nice chance to come to the Sunny South and visit a

part of the country they had never seen before, because they knew nothing of the program at that time, but I feel quite agreeably impressed with the attendance at this meeting.

My concluding service as President of this organization is to turn over the gavel and authority of the presidency to our incoming President, Dr. Edson E. Getman. Dr. Getman, would you come to the platform?

DR. EDSON E. GETMAN — Thank you so much for your confidence in me. This selection has meant the achievement of a lifetime, which I am most happy to accept. I hope that within the next year we will see further progress in our Association. I am certain that we are faced with a challenge, many challenges, in the coming year. I also realize how difficult it is going to be to equal or even approach the performance of Dr. Simmons and his colleagues, displayed in the past few days.

On October 23, 24, and 25 — that is Wednesday, Thursday and Friday — next year, we will hold our meeting at the Hotel Statler in New York. I hope we will have as large an attendance as we have here.

Is there any further business to come before this meeting?

DR. WILLIAM BOLT — Mr. President, you have referred to the wonderful performance of Dr. Ralph Simmons as President. I am sure that all agree with you. This has been a very successful meeting, and he is also to be congratulated because of his initiative in bringing the meeting to a city like New Orleans. I would like to move a hearty vote of thanks to Dr. Ralph Simmons for the splendid job he has done this year.

DR. GETMAN — Do I hear a second?

DR. JAMES R. GUDGER — Second.

DR. GETMAN — Is there any further business to be brought before this meeting before we adjourn?

DR. LAURITZ S. YLVISAKER — Dr. Simmons mentioned all the work that Dr. Voss has done to make our meeting such a delightful one. I think we would all like to join with Dr. Simmons and express our appreciation to Dr. Voss, Mrs. Voss, and their daughter, Mrs. Singreen, and the entire Pan American, for their

delightful party and for all they have done to make the meeting a very happy one and giving us all a delightful visit here in New Orleans.

DR. GETMAN — You have heard the motion, is there a second?

DR. SHANNON — Mr. Chairman, I think we ought to officially thank the Roosevelt Hotel management for the excellent service they have given us.

DR. GETMAN — Would you like to put that in the form of a motion?

DR. SHANNON — Yes.

DR. MONTGOMERY — Mr. Chairman, this is a period of change, as you all know. Maybe some of us haven't recognized the fact that a gentleman who has been sitting up on the platform for about a period of ten years is due to be moved uphill. That is to say, our Secretary, Harry Kirkland, will not be Secretary next year. Someone mentioned that fact to me last night and I agreed with them that we should say a word about Harry. After all, over these many years the past presidents are the ones who really know about the Secretary. Harry has done a most excellent job of running everything. As a matter of fact, he was very quiet today — I do not think he was off the platform once — but as a rule he is in and out and up and down. I think he knows more people in the Association by their first name than anybody else. He has been a tower of strength in everything that has happened, and, as a matter of fact, thinking about this last night I was reminded of some poetry that we used to know when we went to school, and I thought it sort of described Harry:

"I come from haunts of coot and hern,
I make a sudden sally,
And sparkle out among the fern
To bicker down a valley

And draw them all along and flow
To join the brimming river,
For men may come and men may go
But I go on forever."

This time he is not going to go on forever, because he has a new job, but I would like to make this motion, that this Association place on record most hearty thanks to Harry Kirkland for a job well done as Secretary of this Association for the past ten years.

DR. GETMAN — I believe we passed that motion by acclamation.

Is there any further business? If not, the meeting stands adjourned.

MEMBERS PRESENT

The following doctors were present at some time during the sessions:

C. B. Ahlefeld
Joseph Altman
Serafin Andaya
F. R. Anderson
K. W. Anderson
N. L. Armstrong

Bernard Baillargeon
J. A. Bargen
N. J. Barker
J. R. Beard
J. E. Bee
C. C. Berwick
W. R. Bishop
J. E. Boland
William Bolt
M. T. Boss
K. F. Brandon
C. A. Brown
C. F. Brown
G. E. Burch

D. G. Cameron
D. B. Campbell
R. L. Candage
H. E. Christensen
N. S. Clark
M. H. Clifford
H. A. Cochran, Jr.
N. B. Cole
F. R. Congdon
H. K. Crutcher

H. D. Delamere
F. R. Dieuaide
H. W. Dingman
A. H. Domm
R. L. Dross
T. C. Dunlop

J. G. Falconer
R. K. Farnham
W. S. Fewell
R. M. Filson
P. M. L. Forsberg

D. S. Garner
D. R. Gaskins
E. E. Getman
F. W. Gluck
R. A. Goodell
J. K. Gordon
A. S. Graham
J. R. Gudger
V. W. Gunter

F. T. Hallam
G. W. Halpenny
V. G. Hammond
O. E. Hanes
J. A. A. Harcourt
O. C. Hardwig
F. F. Harris
H. M. Hawkins
J. G. Heard
E. V. Higgins
H. W. H. Hill
R. L. Holman
J. C. Horan
L. G. Horan
A. A. Humphrey
J. H. Humphries
J. R. B. Hutchinson

A. S. Irving
J. G. Irving

A. N. Jay
J. W. Johnson, Jr.
R. M. Johnson

E. A. Keenleyside
N. C. Kiefer
C. E. Kiessling
D. G. Kilgore
Richard King
C. T. Kirchmaier
H. B. Kirkland
W. L. Knott
Edward Kuck
Paul Kurzweg, Jr.

P. H. Langner, Jr.
L. G. LaPointe
W. F. Larrabee, Jr.
E. H. Lindstrom
G. W. Lougheed
J. F. Lovejoy
G. J. Lunz

William MacDonald
D. T. McEwan
A. J. McGanity
F. J. McGurl
J. C. MacKenzie
W. J. McNamara
J. K. McShane
Morton Magiday
J. H. Marks
C. G. Martin

P. S. Metzger
L. C. Miller
M. B. Miller
R. M. Miskimon
Eugene Montgomery
R. C. Montgomery
J. F. Moore, Jr.
J. R. Murphy

R. M. Nay

A. J. Oberlander
J. E. O'Donnell
W. F. H. O'Neill

A. E. Parks
J. S. Pearson
J. McC. Peck
D. S. Pepper
W. O. Purdy
M. A. Puzak

R. R. Rambo
J. H. Ready
C. L. Reeder
P. V. Reinartz
G. P. Robb
D. C. Roberts
R. C. Roskelley
J. G. Ross
Fred Rueter

D. Y. Sage
R. S. Schaaf
K. F. Schaefer
F. L. Scheyer
L. P. Schroeder
P. C. Schwager
B. T. D. Schwarz
W. H. Scoins
R. C. Secor
A. F. Seibert
D. L. Selby
T. S. Sexton
Hall Shannon
R. R. Simmons
H. N. Simpson
R. B. Singer
B. W. Sitterson
D. E. Small
F. H. Smith
F. A. Snyder
Edmond Souchon
C. G. Spivey
F. L. Springer

H. F. Starr
H. F. Starr, Jr.
J. B. Steele
Lee Stover
M. J. Taylor
G. F. Tegtmeyer
L. S. Thompson
W. C. Thompson
W. B. Thornton
Joseph Travenick, Jr.
Wallace Troup
H. E. Ungerleider
B. W. Vale
F. P. Valenzuela
R. C. Voss
R. V. Ward
F. A. Warner
R. L. Weaver
J. L. Weinstock
S. S. Werth
G. H. White
J. A. Wilhelm
E. S. Williams
A. C. Wilson
J. S. Winder
L. S. Ylvisaker
G. G. Young
A. R. Zintek

Also present were:

J. F. Anderson
P. M. Anderson
E. F. Brewer
R. A. Burke
C. R. Craig
J. P. Donnelly
L. I. Dublin
C. H. Ellis
J. R. Follmann, Jr.
Franz Hindermann
R. L. Hindermann
F. W. Hubbell
P. C. Irwin
Fritz Lindley
J. F. Loutit
C. H. Madison
H. H. Marks
L. N. Parker
J. Y. Ruddock
O. G. Sherman
C. J. Smith
W. M. Stufflebeem
R. J. Vanderbeck
J. C. Wilberding

Total attendance at all sessions, 201.

In Memoriam

Deceased since the Sixty-fourth Annual Meeting

E. A. Anderson, M. D.
Modern Woodmen of America
Rock Island, Ill.
Died October 14, 1956

Harry B. Kidd, M. D.
Metropolitan Life Insurance Company
Ottawa, Canada
Died January 18, 1956

Linford H. Lee, M. D.
Pacific Mutual Life Insurance Company
Los Angeles, Calif.
Died April 13, 1956

Loren K. Meredith, M. D.
National Life Company
Des Moines, Iowa
Died September 13, 1956

Frederick D. Munroe, M. D.
Fidelity Life Assurance Company
Regina, Canada
Died November 19, 1955

H. Crawford Scadding, M. D. (Emeritus Member)
Canada Life Assurance Company
Toronto, Canada
Died August 13, 1956

Joel E. Toothaker, M. D.
Sunset Life Insurance Company
Olympia, Wash.
Died April 6, 1955

Dick P. Wall, M. D.
American National Insurance Company
Galveston, Texas
Died July 18, 1954

LIST OF MEMBERS OF THE ASSOCIATION OF LIFE INSURANCE MEDICAL DIRECTORS OF AMERICA

Fred B. Agee, Jr., M. D.	Aetna, Hartford, Conn.
Charles B. Ahlefeld, M. D.	Business Men's, Kansas City, Mo.
Allan B. Ainley, M. D.	Travelers, Hartford, Conn.
Arthur C. Albright, M. D.	Victory Mutual, Chicago, Ill.
Henry Almond, M. D.	Metropolitan, New York City
Joseph Altman, M. D.	Companion Life, New York City
E. A. Anderson, M. D.	Modern Woodmen, Rock Island, Ill.
Frank R. Anderson, M. D.	Pacific Mutual, Los Angeles, Calif.
Karl W. Anderson, M. D.	Northwestern National, Minneapolis, Minn.
Perry A. Anderson, M. D.	Rockford Life, Rockford, Ill.
George B. Appleford, M. D.	Business Men's, Kansas City, Mo.
Thomas M. Armstrong, M. D.	Philadelphia Life, Philadelphia, Pa.
Bernard Baillargeon, M. D.	Alliance Nationale, Montreal, Canada
William S. Barcus, M. D.	Pioneer American, Ft. Worth, Tex.
Norman J. Barker, M. D.	Connecticut General, Hartford, Conn.
Gordon P. Barnett, M. D.	Kansas City Life, Kansas City, Mo.
Charles M. Barrett, M. D.	Western and Southern, Cincinnati, Ohio
G. Robert Bartron, M. D.	Midland National, Watertown, S. D.
Samuel F. Bassett, M. D.	Prudential, Newark, N. J.

Eliot F. Beach, Ph. D.	Metropolitan, New York City
Irwin W. Bean, M. D.	Fidelity, Regina, Can.
J. Randolph Beard, M. D.	Mutual Benefit, Newark, N. J.
James E. Bee, M. D.	Kansas City Life, Kansas City, Mo.
Murray F. Bell, M. D.	New York Life, New York City
Maurice B. Bender, M. D.	Guardian, New York City
David M. Benford, M. D.	Metropolitan, New York City
Robert A. Benson, M. D.	Metropolitan, Ottawa, Canada
Roy W. Benton, M. D.	Northwestern Mutual, Milwaukee, Wis.
C. Coleman Berwick, M. D.	Metropolitan, San Francisco, Calif.
Francis P. Bicknell, M. D.	State Mutual, Worcester, Mass.
B. Cosby Bird, M. D.	Preferred, Montgomery, Ala.
William R. Bishop, M. D.	Provident Life Acc., Chattanooga, Tenn.
Abraham Block, M. D.	Workmen's Benefit, Brooklyn, N. Y.
John E. Boland, M. D.	Country, Chicago, Ill.
William Bolt, M. D.	New York Life, New York City
John M. Bond, M. D.	Northwestern Mutual, Milwaukee, Wis.
Earl C. Bonnett, M. D.	Metropolitan, New York City
M. Theodore Boss, M. D.	Home Friendly, Baltimore, Md.
John R. Bowen, M. D.	Penn Mutual, Philadelphia, Pa.
J. Thornley Bowman, M. D.	London Life, London, Canada
Ernest L. Boylen, M. D.	Standard, Portland, Ore.
Robert D. Boynton, M. D.	State Mutual, Worcester, Mass.

William R. Bradley, M. D.	Phoenix Mutual, Hartford, Conn.
Kenneth F. Brandon, M. D.	Aetna, Hartford, Conn.
David J. Breithaupt, M. D.	Manufacturers, Toronto, Canada
Harvey J. Brekke, M. D.	Lutheran Brotherhood, Minneapolis, Minn.
Robert D. Brewer, Jr., M. D.	Prudential, Chicago, Ill.
Harry Brodsky, M. D.	Beneficial Standard, Los Angeles, Calif.
Edmund J. Brogan, M. D.	Provident Mutual, Philadelphia, Pa.
Albert W. Bromer, M. D.	Metropolitan, New York City
Arthur E. Brown, M. D.	New England Mutual, Boston, Mass.
C. Frank Brown, M. D.	Southwestern, Dallas, Tex.
Howard B. Brown, M. D.	Massachusetts Mutual, Springfield, Mass.
Ronald F. Buchan, M. D.	Prudential, Newark, N. J.
Carroll A. Burroughs, M. D.	Peoples, Frankfort, Ind.
W. Lawrence Cahall, Jr., M. D.	John Hancock Mutual, Boston, Mass.
Douglas G. Cameron, M. D.	Prudential Assurance, Montreal, Can.
Douglas B. Campbell, M. D.	National, Toronto, Can.
Raymond L. Candage, M. D.	State Mutual, Worcester, Mass.
David W. Carter, Jr., M. D.	Reserve Life, Dallas, Tex.
Paul H. Charlton, M. D.	Midland Mutual, Columbus, Ohio
Harry E. Christensen, M. D.	Union Mutual, Portland, Me.
Norman S. Clark, M. D.	Independent Order of Foresters, Toronto, Can.

Howard R. Clement, M. D.	John Hancock Mutual, Boston, Mass.
Robert B. Cleveland, M. D.	Equitable Life Assurance, New York City
Milton H. Clifford, M. D.	New England Mutual, Boston, Mass.
Harry A. Cochran, Jr., M. D.	Lincoln National, Fort Wayne, Ind.
John E. C. Cole, M. D.	North American, Toronto, Canada
Norman B. Cole, M. D.	Baltimore Life, Baltimore, Md.
Irwin E. Colgin, M. D.	Texas Life, Waco, Tex.
G. R. Collyer, M. D.	London Life, London, Canada
Harry L. Colombo, M. D.	National Life, Montpelier, Vt.
Berthold R. Comeau, M. D.	Northeastern, New York City
Frederick R. Congdon, M. D.	Berkshire, Pittsfield, Mass.
Chester E. Cook, M. D.	Southwestern, Dallas, Tex.
J. Lindsay Cook, M. D.	Pilot, Greensboro, N. C.
Robert H. Craig, M. D.	Mutual, Waterloo, Can.
Neil L. Criss, M. D.	United Benefit, Omaha, Neb.
Henry A. Cromwell, M. D.	American Capitol, Houston, Tex.
Howard K. Crutcher, M. D.	United Fidelity, Dallas, Tex.
Khurshed J. J. Cursetji, M. D.	Oriental Government Security Life, Bombay, India
John P. Davis, M. D.	Security Life & Trust, Winston-Salem, N. C.
Bryan A. Dawber, M. D.	Penn Mutual, Philadelphia, Pa.
John S. Delahaye, M. D.	Empire Life, Kingston, Canada
Harold D. Delamere, M. D.	Crown, Toronto, Canada

Aniceto Del Rio, M. D.	La Nacional, Mexico City, Mexico
Earle T. Dewey, M. D.	Metropolitan, San Francisco, Calif.
John A. Dillon, M. D.	Puritan, Providence, R. I.
Harry W. Dingman, M. D.	Continental Assurance, Chicago, Ill.
Fred Dinkler, M. D.	Great Southern, Houston, Tex.
Albert H. Domm, M. D.	Prudential, Los Angeles, Calif.
Robert M. Donauer, M. D.	Prudential, Newark, N. J.
James P. Donelan, M. D.	Guarantee Mutual, Omaha, Neb.
Verner J. Donnelly, M. D.	Prudential, Houston, Tex.
Gerald D. Dorman, M. D.	New York Life, New York City
James T. Downs, Jr., M. D.	Fidelity Union, Dallas, Tex.
Raymond L. Dross, M. D.	Prudential, Houston, Tex.
Thomas C. Dunlop, M. D.	Manufacturers, Toronto, Canada
Louis B. Dunn, M. D.	Postal, New York City
William W. Eakin, M. D.	Standard, Montreal, Canada
Lyon H. Earle, Jr., M. D.	Connecticut General, Hartford, Conn.
Theodore M. Ebers, M. D.	Connecticut Mutual, Hartford, Conn.
Laurence B. Ellis, M. D.	Boston Mutual, Boston, Mass.
Louis J. Emanuele, M. D.	New York Life, New York City
James C. Emmett, M. D.	Imperial, Toronto, Canada
Jack A. End, M. D.	Northwestern Mutual, Milwaukee, Wis.

Albert H. Faber, M. D.	New York Life, New York City
J. Gilbert Falconer, M. D.	North American, Toronto, Canada
Raymond K. Farnham, M. D.	Metropolitan, New York City
William S. Fewell, M. D.	Liberty, Greenville, S. C.
Ralph M. Filson, M. D.	Travelers, Hartford, Conn.
Rexford W. Finegan, M. D.	Metropolitan, New York City
James G. Forgerson, M. D.	Metropolitan, San Francisco, Calif.
Philip M. L. Forsberg, M. D.	United Life and Accident, Concord, N. H.
Garth E. Fort, M. D.	National Life & Accident, Nashville, Tenn.
Arthur C. Fortney, M. D.	Western States, Fargo, N. D.
John M. Foster, M. D.	Capitol, Denver, Colo.
John T. France, M. D.	State Farm, Bloomington, Ill.
Edward M. Freeland, M. D.	New York Life, New York City
Clarence E. Fronk, M. D.	Hawaiian Life, Honolulu, T. H.
Robert E. Funke, M. D.	Prudential, Los Angeles, Calif.
F. Irving Ganot, M. D.	Prudential, Newark, N. J.
I. Kenneth Gardner, M. D.	Lincoln National, Ft. Wayne, Ind.
David S. Garner, M. D.	Shenandoah, Roanoke, Va.
J. H. Geddes, M. D.	Northern, London, Canada
John T. Geiger, M. D.	Metropolitan, New York City
John P. Gemmell, M. D.	Monarch, Winnipeg, Canada
William M. Genthner, M. D.	Continental American, Wilmington, Del.

Edson E. Getman, M. D.	New York Life, New York City
Charles A. Gianasi, M. D.	Continental Assurance, Chicago, Ill.
Edgar G. Givhan, Jr., M. D.	Protective, Birmingham, Ala.
Francis W. Gluck, M. D.	Monumental, Baltimore, Md.
Robert A. Goodell, M. D.	Phoenix Mutual, Hartford, Conn.
George Goodkin, M. D.	Equitable Life Assurance, New York City
Harold M. Goodman, M. D.	Home Beneficial, Richmond, Va.
Harry W. Goos, M. D.	Home, Philadelphia, Pa.
J. Keith Gordon, M. D.	Sun, Montreal, Canada
Robert S. Gordon, M. D.	Security-Connecticut, New Haven, Conn.
Charles D. Gossage, M. D.	Confederation, Toronto, Canada
Angus S. Graham, M. D.	London Life, London, Canada
George M. Graham, M. D.	Lincoln National, Fort Wayne, Ind.
Albert L. Grasmick, M. D.	Equitable Life Assurance, New York City
Ghent Graves, M. D.	American General, Houston, Tex.
Harris M. Gray, M. D.	Manufacturers, Toronto, Canada
Floyd M. Green, M. D.	Columbus Mutual, Columbus, Ohio
George E. Greenway, M. D.	Western Life Assurance, Hamilton, Canada
Frederick O. Gronvold, M. D.	Pioneer Mutual, Fargo, N. D.
Bruce F. Grotts, M. D.	Prudential, Chicago, Ill.
Albert C. Grunow, M. D.	Prudential, Newark, N. J.
Richard S. Gubner, M. D.	Equitable Life Assurance, New York City
James R. Gudger, M. D.	Mutual, New York City

Van W. Gunter, M. D.	Jefferson Standard, Greensboro, N. C.
Frank R. N. Gurd, Ph. D.	Equitable Life Assurance, New York City
Milton W. Gwinner, M. D.	Western and Southern, Cincinnati, Ohio
Thomas R. Hale, M. D.	Sun, Montreal, Canada
I. Macdonald Hall, M. D.	Massachusetts Mutual, Springfield, Mass.
Llewellyn Hall, M. D.	Phoenix Mutual, Hartford, Conn.
F. Tulley Hallam, M. D.	Bankers, Des Moines, Iowa
John H. Halliday, M. D.	Australian Mutual, Sydney Australia
Gerald W. Halpenny, M. D.	Royal, Montreal, Canada
Vincent G. Hammond, M. D.	Security Mutual, Binghamton, N. Y.
Ottis E. Hanes, M. D.	Life Ins. Co. of Ga., Atlanta, Ga.
John A. A. Harcourt, M. D.	Toronto Mutual, Toronto, Canada
Frank F. Harris, M. D.	Volunteer State, Chattanooga, Tenn.
Albert H. Harrop, M. D.	Great-West, Winnipeg, Can.
T. Haynes Harvill, M. D.	Preferred Life, Dallas, Tex.
Garland M. Harwood, M. D.	Life Insurance Co. of Virginia, Richmond, Va.
Louis E. Hathaway, Jr., M. D.	Monarch, Springfield, Mass.
Howard L. Hauge, M. D.	New York Life, New York City
Walter C. Hausheer, M. D.	Prudential, Newark, N. J.
Harry M. Hawkins, M. D.	Old Line, Milwaukee, Wis.
Thomas L. Hawkins, M. D.	Western, Helena, Mont.

J. Harry Hayes, M. D.	Union, Little Rock, Ark.
Harvey D. Hebb, M. D.	Life Insurance Co. of Alberta Edmonton, Canada
Milton H. Henderson, M. D.	Excelsior, Toronto, Canada
Olin C. Hendrix, M. D.	New England Mutual, Boston, Mass.
Roger E. Henning, M. D.	Aid Association for Lutherans, Appleton, Wis.
William A. Henry, M. D.	Franklin, Springfield, Ill.
Ivan C. Heron, M. D.	West Coast, San Francisco, Calif.
Harry H. Hershey, M. D.	Equitable Life Assurance, New York City
William D. Hickerson, M. D.	Union Central, Cincinnati, Ohio
Eugene V. Higgins, M. D.	North American Reassurance, New York City
Ernest C. Hillman, Jr., M. D.	Mutual Benefit, Newark, N. J.
Daniel W. Hoare, M. D.	Penn Mutual, Philadelphia, Pa.
Joseph C. Horan, M. D.	Metropolitan, New York City
Arnold B. Houston, M. D.	Great-West, Winnipeg, Canada
Edward G. Howe, M. D.	Prudential, Newark, N. J.
Thomas B. Hoxie, M. D.	New York Life, New York City
Henry W. Hudson, M. D.	Loyal Protective, Boston, Mass.
Gene I. Hull, M. D.	Bankers, Des Moines, Iowa
Merwin L. Hummel, M. D.	Acacia Mutual, Washington, D. C.
Arthur A. Humphrey, M. D.	Federal Life and Casualty, Battle Creek, Mich.
John L. Humphreys, M. D.	Lincoln National, Ft. Wayne, Ind.
James H. Humphries, M. D.	Home, New York City
J. Edward Hunsinger, M. D.	Republic Nat'l, Dallas, Tex.

Benjamin L. Huntington, M. D.	John Hancock Mutual, Boston, Mass.
John J. Hutchinson, M. D.	New York Life, New York City
J. Raymond B. Hutchinson, M. D.	Acacia Mutual, Washington, D. C.
Albert S. Irving, M. D.	Commonwealth, Louisville, Ky.
J. Grant Irving, M. D.	Aetna, Hartford, Conn.
Tsugitake Isshiki, M. D.	Asahi Mutual, Tokyo, Japan
Samuel Jagoda, M. D.	State Reserve, Fort Worth, Tex.
Fred E. Jenkins, M. D.	Equitable Life Assurance, New York City
Hubert R. John, M. D.	Maccabees, Detroit, Mich.
Joseph W. Johnson, Jr., M. D.	Interstate Life and Accident, Chattanooga, Tenn.
Alfred Kahn, Jr., M. D.	National Equity, Little Rock, Ark.
Victor L. Karren, M. D.	Home, New York City
Edward A. Keenleyside, M. D.	Prudential, Toronto, Canada
Frank J. Kefferstan, II, M. D.	John Hancock Mutual, Boston, Mass.
Charles H. Kelley, M. D.	Columbian National, Boston, Mass.
Newell R. Kelley, M. D.	Bankers, Des Moines, Iowa
Herbert B. Kennedy, M. D.	Woodmen of the World, Omaha, Neb.
Roeinton B. Khambatta, M. D.	American Life, Karachi, Pakistan

Norvin C. Kiefer, M. D.	Equitable Life Assurance, New York City
Charles E. Kiessling, M. D.	Prudential, Newark, N. J.
Donald G. Kilgore, M. D.	Republic National, Dallas, Tex.
Richard King, M. D.	Family Fund, Atlanta, Ga.
Carl T. Kirchmaier, M. D.	Life & Casualty, Nashville, Tenn.
Henry B. Kirkland, M. D.	Prudential, Newark, N. J.
Norman L. Knott, M. D.	Prudential, Los Angeles, Calif.
Edward Kuck, M. D.	Union Central, Cincinnati, Ohio
Paul Kurzweg, Jr., M. D.	All American Assurance, Lafayette, La.
Ewart R. Lamb, M. D.	Paul Revere, Hamilton, Canada
Phillips Lambkin, M. D.	Guardian, New York City
Paul H. Langner, Jr., M. D.	Provident Mutual, Philadelphia, Pa.
L. Gordon LaPointe, M. D.	Manhattan Life, New York City
H. Franklyn Laramore, M. D.	Connecticut Mutual, Hartford, Conn.
Rodney C. Larcom, Jr., M. D.	Massachusetts Indemnity, Boston, Mass.
Walter F. Larrabee, Jr., M. D.	Minnesota Mutual, St. Paul, Minn.
Albert L. Larson, M. D.	Travelers, Hartford, Conn.
Dwight Lawson, M. D.	Victory, Topeka, Kan.
James M. Leffel, M. D.	Empire L. & A., Indianapolis Ind.
Harold R. Leffingwell, M. D.	Paul Revere, Worcester, Mass.
Richard J. Lempke, M. D.	Mutual, New York City
Charles P. LeRoyer, Jr., M. D.	Travelers, Hartford, Conn.

William R. Leute, Jr., M. D.	Penn Mutual, Philadelphia, Pa.
Janus C. Lindner, M. D.	Prudential, Minneapolis, Minn.
Everett H. Lindstrom, M. D.	Western, Helena, Mont.
Roger P. Lochhead, M. D.	Bankers National, Montclair, N. J.
Gladstone W. Lougheed, M. D.	Confederation, Toronto, Canada
John F. Lovejoy, M. D.	United Life, Jacksonville, Fla.
David Luchs, M. D.	Connecticut Mutual, Hartford, Conn.
Gerald J. Lunz, M. D.	Knights of Columbus, New Haven, Conn.
Frank M. McChesney, M. D.	Equitable, Washington, D. C.
William J. McConnell, M. D.	Metropolitan, New York City
Howard M. McCue, Jr., M. D.	Life Insurance Co. of Virginia, Richmond, Va.
Murdo G. MacDonald, M. D.	National, Montpelier, Vt.
William MacDonald, M. D.	Teachers Insurance & Annuity Association, New York City
Duncan T. McEwan, M. D.	National Standard, Orlando, Fla.
Arthur J. McGanity, M. D.	Dominion, Waterloo, Canada
J. David McGaughey, III, M. D.	Connecticut General, Hartford, Conn.
Frank J. McGurl, M. D.	Prudential, Houston, Tex.
Thomas J. McGurl, Jr., M. D.	Mutual, New York City
J. Stewart McInnes, M. D.	Sovereign, Winnipeg, Can.
Charles D. McKeown, M. D.	Farmers & Bankers, Wichita, Kan.
William G. McLaughry, M. D.	Protected Home Circle, Sharon, Pa.
George McLean, M. D.	Sun, Baltimore, Md.

Lawrence L. McLellan, M. D.	Provident Mutual, Philadelphia, Pa.
Ralph E. McLochlin, M. D.	National Old Line, Little Rock, Ark.
William J. McNamara, M. D.	Equitable Life Assurance, New York City
Charles D. Magee, M. D.	Life Ins. Co. of Mo., St. Louis, Mo.
Morton Magiday, M. D.	Equitable Life Assurance, New York City
S. J. Newton Magwood, M. D.	Continental, Toronto, Canada
John Malgieri, M. D.	New York Life, New York City
J. Herbert Marks, M. D.	Guaranty Union, Beverly Hills, Calif.
Clement G. Martin, M. D.	Continental Assurance, Chicago, Ill.
Peter V. Martin, M. D.	Prudential, Minneapolis, Minn.
Francis A. L. Mathewson, M. D.	Great-West, Winnipeg, Canada
John W. Merritt, M. D.	Dominion, Waterloo, Canada
Ignacio Mesa, M. D.	"La Latino-Americana", Mexico City, Mexico
Paul S. Metzger, M. D.	Nationwide Life, Columbus, Ohio
Lloyd C. Miller, M. D.	National Life & Accident, Nashville, Tenn.
Milton B. Miller, M. D.	Victory Life, Topeka, Kan.
Edward S. Mills, M. D.	Prudential Assurance, Montreal, Canada
Eugene Montgomery, M. D.	North American, Toronto, Canada
Richard C. Montgomery, M. D.	Manufacturers, Toronto, Canada
John F. Moore, Jr., M. D.	Mutual, New York City
Samuel R. Moore, M. D.	Provident Mutual, Philadelphia, Pa.
J. R. E. Morden, M. D.	Massachusetts Mutual, Springfield, Mass.

J. Palmer Moss, M. D.	Columbian Mutual, Memphis, Tenn.
Bernard Mount, M. D.	All States, Montgomery, Ala.
Elmer B. Mountain, M. D.	American Mutual, Des Moines, Iowa
Clifford V. Mulligan, M. D.	T. Eaton, Toronto, Canada
Luiz Murgel, M. D.	Companhia Internacional, Rio de Janeiro, Brazil
George H. Murphy, M. D.	Maritime, Halifax, Canada
John R. Murphy, M. D.	North American Reassurance, New York City
Sidney A. Narins, M. D.	Mutual, New York City
Richard M. Nay, M. D.	Indianapolis Life, Indianapolis, Ind.
Mather H. Neill, M. D.	Aetna, Hartford, Conn.
Richard A. Nelson, M. D.	Prudential, Jacksonville, Fla.
Richard E. Nicholson, M. D.	Connecticut Mutual, Hartford, Conn.
Charles A. Nordin, M. D.	Equitable, Des Moines, Iowa
William P. Nuessle, M. D.	Prudential, Minneapolis, Minn.
Andrew J. Oberlander, M. D.	Prudential, Chicago, Ill.
William L. O'Connell, M. D.	Union Labor, New York City
Robert D. O'Connor, M. D.	Old Line, Milwaukee, Wis.
Robert J. Oehrig, M. D.	Home, New York City
Denis J. O'Leary, M. D.	New York Life, New York City
Martin I. Olsen, M. D.	Central, Des Moines, Iowa
William F. H. O'Neill, M. D.	Franklin, Springfield, Ill.

Earl T. Opstad, M. D.	Northwestern National, Minneapolis, Minn.
John K. T. Ormrod, M. D.	Aetna, Hartford, Conn.
Arthur E. Parks, M. D.	Canada Life, Toronto, Canada
John S. Pearson, M. D.	American United, Indianapolis, Ind.
John McC. Peck, M. D.	John Hancock Mutual, Boston, Mass.
D. Sergeant Pepper, M. D.	Connecticut Mutual, Hartford, Conn.
Gilberto S. Pesquera, M. D.	Metropolitan, New York City
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